

REVISION OF THE BEETLES OF THE GENUS *DISONYCHA* OCCURRING IN AMERICA NORTH OF MEXICO

By DORIS HOLMES BLAKE

*Assistant Entomologist, Bureau of Entomology, United States Department of
Agriculture*

HISTORY OF THE GENUS

The generic name *Disonycha* Chevrolat first appeared in the Dejean Catalogue of 1837¹ with 31 species listed under it. In 1844 Chevrolat² defined the genus as follows:

Disonycha (δύς δύο, ὄνυξ ongle). Genre de Coléoptères tétrameres, famille des Cycliques, tribu des Alticités, créé par nous, et adopté par M. Dejean, qui, dans son Catalogue, en énumère 30 [sic] espèces, dont 26 appartiennent à l'Amérique, 3 à l'Afrique australe et une à l'Asie. Nous citerons, parmi les premières, les *D. glabrata*, *conjugata*, *caroliniana* et *collaris* (*altica*) de Fabricius, *5-lineata*, *6-lineata* d'Olivier, et *4-vittata* d'Illiger. Les insectes qui composent ce g. sont de moyenne grandeur; presque tous ont les élytres noires avec des lignes longitudinales jaunes; leurs tibias sont terminés extérieurement par deux ongles excessivement petits.

Of the original 31 species listed in the Dejean Catalogue, at least 6 of the North and South American species had been previously described, possibly more. Of these, only four are now considered as belonging to the genus *Disonycha*. *Galleruca collaris* Fabricius³ is not recognizable, and *Haltica quadrivittata* Illiger⁴ was listed by Illiger under the group Oedipodes. The remainder are: *Crioceris caroliniana* Fabricius,⁵ *C. glabrata* Fabricius,⁶ *C. collata* Fabricius,⁷ and *Haltica conjuncta* Germar.⁸ Since no previous designation seems to have been made, *Crioceris collata*, the most definitely described of the North American species included by Chevrolat (in Dejean), is hereby designated as the type of the genus.

¹ Catalogue des coléoptères de la collection de M. le Comte Dejean, p. 414, 1837.

² D'Orbigny, Dictionnaire universel d'histoire naturelle, vol. 5, p. 81, 1844.

³ Fabricius, Entomologia systematica, suppl., p. 97, 1798.

⁴ Illiger, Mag. für Insekt., vol. 6, p. 106, 1807.

⁵ Fabricius, Systema entomologiae, p. 122, 1775.

⁶ Fabricius, Species insectorum, vol. 1, p. 156, 1781.

⁷ Fabricius, Systema Eleutheratorum, vol. 1, p. 463, 1801.

⁸ Germar, Insectorum species, p. 610, 1824.

The earlier species of *Disonycha*—*caroliniana*, *glabrata*, *conjugata*, *collata*, and *discoidea*—were described by Fabricius in the genera *Crioceris*, *Chrysomela*, and *Galleruca*. Later he referred them all to *Galleruca*, with the exception of *Crioceris collata*, the only one having blue, unicolorous elytra, and *Chrysomela discoidea*, not a vittate form. Olivier (1789)⁹ placed *caroliniana* and *glabrata*, and later¹⁰ *conjugata* and *collata*, in *Altica*, a name emended by Illiger (1807) to *Haltica*, and this name in one spelling or the other was used for species of *Disonycha*, as well as other flea beetles, till long after the publication of the Dejean Catalogue, not only in European works but in descriptions by the early American coleopterists Harris, Say, and LeConte. Melsheimer¹¹ (1847) was the first in America to describe a species under the name *Disonycha*, and he used the same generic name in his catalogue of 1853 with 19 specific names listed. In Europe the name *Disonycha* appeared in the Sturm Catalogue (1843) and in a description by Mannerheim.¹² Clark (1865)¹³ redefined the genus, and Crotch (1873)¹⁴ constructed the first table of United States species, which contained 11 species and 1 variety. Since then, von Harold, Baly, Jacoby, and Weise have described many new species from South and Central America, and Jacoby, Casey, Horn, Blatchley, and Schaeffer have added 22 new specific names for North American forms. Horn's treatment (1889)¹⁵ of the Halticinae is the only work in which the genus as a whole, as it occurs north of Mexico, has been studied. Horn recognized 18 species, a number raised to 32 in the present revision.

The present paper is not written for the purpose of describing new species. In fact, only 2 new species and 3 new varieties are described. It is rather an attempt to create order in a genus in which, on the one hand, too many specific names have been based on differences in coloration unaccompanied by structural characters and, on the other, too many distinct species have been referred to synonymy. Furthermore, an attempt has been made to show the relationship of the species among themselves and the variations in a given species over its entire range.

DESCRIPTION OF THE GENUS

Disonycha, as a genus, has long been loosely defined because of its few outstanding characters. In order to include such diverse groups as at present make up the genus, the definition must necessarily be

⁹ Olivier Encyclopédie méthodique, vol. 4 (Insects, vol. 1), p. 105, 1789.

¹⁰ Olivier, Entomologie, vol. 6, pp. 686, 702, 1808.

¹¹ Melsheimer, Proc. Acad. Nat. Sci. Philadelphia, vol. 3, p. 163, 1847.

¹² Mannerheim, Bull. Soc. Imp. Moscou, vol. 16, p. 311, 1843.

¹³ Clark, Journ. Ent., vol. 2, no. 13, p. 401, 1865.

¹⁴ Crotch, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873.

¹⁵ Horn, Trans. Amer. Ent. Soc., vol. 16, p. 200, 1889.

wide. The species comprising the genus are for the most part among the larger species of Halticinae. They are distinguished from *Oedionychis*, *Homophoeta*, and other *Oedipodes* by the lack of the inflated hind claw joint. They are generally smaller than the species assigned to *Cacoscelis*, a genus from Central and South America, but, in some instances, difficult to distinguish, and they are so closely related to *Altica* that in some cases they can be distinguished only by the lack of a well-marked basal impression on the prothorax, a feature that is not always very evident in certain species of *Altica*.

The chief diagnostic characters are (1) in the head, in which there is a long extension of the carina or interantennal prominence from between the antennal bases to the suture above the labrum; (2) in the prothorax, which lacks a well-marked transverse basal impression, and the hind angles of which are obliquely truncate; (3) in the open precoxal cavities; and (4) in the hind legs, in which the posterior tibiae are not deeply grooved, the tibiae have a short apical spur, the first tarsal joint is about twice the length of the following one, and the claw joint is slender and appendiculate.

Horn stated that "*Disonycha* is far more homogeneous than *Oedionychis*, the species not exhibiting any marked structural differences among themselves, consequently any attempt at tabulation is more or less based on coloration, which seems to be quite constant as to type but variable in degree." On the contrary, the groups now included in *Disonycha* are not homogeneous but differ far more among themselves than do the groups inside such a genus as, for example, *Trirhabda*. Unfortunately, the material now available is not sufficient to justify an attempt at present to revise the whole genus and possibly to divide it into generic or subgeneric groups. *Disonycha* ranges from Canada to Patagonia. The forms found north of Mexico represent less than half of the described species, and presumably many more from south of the Mexican border are undescribed. Many of the species are not represented in the United States National Museum or other collections examined by me. With our limited representation of the groups of the genus, it is impossible to make more than a local contribution to a comprehensive phylogenetic study of the species of both continents. In a few groups, such as those that occur on boreal food plants, as willow, the relationship of the species can be outlined, but in other groups chiefly confined to tropical regions, as that to which *glabrata* belongs, a single United States species stands out as isolated and unrelated to any other. The most that can be done in a partial study of this kind is to place the species as far as is possible in groups that ultimately may be assembled in a study of wider scope.

These groups of species have certain characters in common. The head is inserted as far as the eyes, and has a fovea on the vertex on each side near the eye, the fovea being usually surrounded to a greater or lesser extent with punctures. The sculpture of the head offers one of the best characters for separating the groups of species. In the *alternata* group, coarse punctures not only surround the fovea but usually extend over most of the occiput and vertex; in the *discoidea* group, on the other hand, a single large pit or fovea on each side is often the only trace of punctation. In some species, such as *xanthomelas*, the punctures are arranged to form a furrow extending from the fovea to the frontal tubercles. These tubercles are also somewhat variable. They are distinctly defined in most species, and in some groups, as the *alternata* group, they are somewhat swollen, while in *latifrons* they are so flat as to be scarcely distinct. The area between the antennal sockets tends to be carinate, although not much produced. In many species, as in *triangularis*, this carina is quite acute, while in others, as in *tenuicornis* and *funerea*, the interantennal area is broad and flat. The carina extends well down the lower front, joining the frontal margin. The antennae, differing somewhat in length according to the sex, those of the male being a little longer, usually do not extend beyond the middle of the elytra, and the third joint is shorter than or subequal to the fourth. In the female, the eighth, ninth, and tenth antennal joints are slightly shorter and slenderer than in the male.

The shape of the prothorax differs greatly in different groups. In general, the prothorax is nearly the same width as the elytra, approximately twice as broad as long, sometimes more, and occasionally a little less. It is slightly narrowed anteriorly with a more or less arcuate, narrow, sharp-edged, lateral margin, much narrower than in *Oedionychis*. The basal margin is somewhat sinuate, with the hind angles obliquely truncate. In some groups of species, as the *pensylvanica* and *alternata* groups, the pronotum is not very convex, and there are lateral callosities and a slight median basal depression, while in others, as the *discoidea* and *fumata* groups, the pronotum is smooth, convex, and without depressions.

The elytra are either oblong with parallel sides or oval with rounded sides. The humeri vary in prominence, and are often marked by a short sulcus on the inner side, referred to in the descriptions of the species in this paper as an intrahumeral sulcus or depression. In the *pensylvanica* and *alternata* groups, there is a distinct tendency toward elytral ridging in the female, the costae sometimes extending from the humeri nearly to the apex. There is always a narrow lateral explanate margin, not extending to the apex, and beneath, the epipleura gradually narrow to the apex. The elytra are not striate, but confusedly and never very coarsely punctate.

They are smooth, except in the costate species, usually shining and glabrous. The prosternum divides the coxae, and the precoxal cavities are open behind. The last visible sternite in the male is truncate and in the female angulate. The legs are relatively short and the tibiae feebly sulcate on the outer edge with a short apical spur. In the male the first joint of the anterior tarsi is much enlarged. The claws have a short basal tooth.

The shape of the aedeagus corroborates the other structural characters by which the species are separable into groups. In the vittate species the shape of the aedeagus is of much greater value in distinguishing relationships than is the coloration. The aedeagi of the species with blue or green elytra are quite unlike those of any of the vittate species except *D. maritima*, a species structurally unique among the vittate ones. The aedeagi of these dark species offer excellent specific differences. The aedeagus of *D. funerea* also is quite unlike that of any other species. It is so difficult to describe the shape of this structure that little has been attempted in the text, but figures showing the dorsal, ventral, and lateral views have been made and should be consulted in determining the species.

The coloring is fairly constant within a species. In the vittate yellow and black species, the head may be pale, bicolored, or entirely dark. The pronotum of the vittate species usually has at least traces of 2 to 5 spots, which sometimes coalesce or band together. The elytra usually have dark sutural, median, and submarginal or marginal vittae. In some groups, as the *discoidea* group, the submarginal vitta is either very faint or lacking. The median and sutural vittae are usually present except in pale varieties of a species, in which they may become interrupted or disappear. Only 1 or 2 pale species north of Mexico are without elytral vittae—*antennata*, an entirely pale Mexican species occurring only at the tip of Florida, and *figurata*, also a Mexican species, found in this country in Arizona and Nevada, in which the vittae are frequently indistinct. The species having blue or green elytra are nearly as homogeneous in coloration as the vittate species. The former can be distinguished from one another by the color of the head, femora, and lower surface, which may be pale, bicolored, or dark. Only one, *funerea*, is entirely dark except for the last ventral segment, and this species is structurally unlike the others.

DESCRIPTION OF THE GROUPS

Since 10 of the 32 species found in the United States do not fall into any natural group known to me, and since 3 of the others are the only representatives of 2 southern groups, I have not been able to work out a satisfactory natural key according to these groups. In lieu of this, a short discussion of the groups is here given, with

a more artificial but all-inclusive key, based mainly on color differences, appended for practical use in the identification of the species.

The first group, the *pensylvanica* group, is composed of 5 northern species, *pensylvanica*, *conjugata*, *procera*, *uniguttata*, and *limbicollis*, and at least 1 Mexican and Central American species, *recticollis*. All of them feed on *Polygonum*. They are slender, oblong insects with parallel sides, often with the dark elytral vittae broader than the pale ones, and with the head and under surface more or less darkened. The pronotum is usually uneven and the elytra of the female distinctly costate. The aedeagi are quite unlike one another in the shape of the dorsal tip, but the differences are more a matter of degree than of radical change in shape.

The second group, the *alternata* group, is composed of four northern species, *alternata*, *pluriligata*, *latiovittata*, and *schaefferi*, and a fifth, *teapensis*, described from Teapa, Mexico. The first four are known to feed on willow. These are the largest of the genus (6 to 8 mm) and are broadly oblong with parallel sides. The head is usually coarsely punctate and, as in the *pensylvanica* group, but to a less degree, the pronotum is uneven and the elytra of the female show traces of costation. The aedeagi differ in the shape of the tip but their differences, as in the *pensylvanica* group, are merely relative.

The third group, the *fumata* group, is composed of two species, *fumata* and *latifrons*, each with several geographic races. As far as known, they feed on *Aster* and *Solidago*. They are more oval in shape than the preceding groups, with smooth, not depressed or uneven, prothorax, and with no traces of elytral costae. The aedeagi of both species are very similar, but the tip in *latifrons* is wider.

The fourth group, the *discoidea* group, is composed of three closely related United States species, *discoidea*, *leptolineata*, and *antennata*, as well as the still undistinguished Mexican and Central American species that were called *abbreviata* Melsheimer in the *Biologia Centrali-Americana*. Except for *discoidea*, which feeds on *Passiflora* sp., the food plants of this group are unknown. The species, while differing greatly in markings, are so similar in structure that it is not easy to determine their specific differences. They may be but varieties of one species. All are broadly oval in shape with smooth, undepressed upper surface, the head is nearly impunctate, having a large fovea near each eye, and the pronotum is smooth and usually unspotted, and all either entirely lack the submarginal elytral vitta or show only faint traces of it. The aedeagi are so much alike as to be hardly distinguishable.

The fifth group is composed of species that have blue or green elytra and that feed on *Amaranthus* and *Chenopodium*, and consists

of *triangularis*, *xanthomelas*, *collata*, *politula*, and probably *semicarbonata*, and several more Mexican and Central American species. *D. laevigata*, known in the West Indies as a garden pest, also belongs to this group of feeders on *Amaranthus*. They are small, oval insects frequently with lustrous elytra. In spite of their similarity in coloring, they differ considerably among themselves and have quite dissimilar aedeagi that do not resemble one another or the aedeagi of the vittate species.

The remaining 13 species are too distinct to fall readily into groups. Three of them, *glabrata*, *varicornis*, and *stenosticha*, are closely related to Mexican and Central American species.

D. glabrata has two close relatives, *nigrita* and *dorsata* Jacoby, the latter with entirely dark elytra. The species *glabrata* and *dorsata* are unlike the other vittate species, except *maritima*, in having, in their well-marked and typical form, a dark elytral margin. *D. glabrata* and its two close relatives are smooth and shining and have a similarly shaped and similarly marked prothorax. Their aedeagi are nearly indistinguishable. *D. glabrata* feeds on *Amaranthus*, as do the members of the fifth group. In shape these three species appear more closely allied to the fifth group than to the vittate groups.

D. varicornis, occurring in Texas and southern California, and feeding on *Opuntia*, is closely related to *mexicana* Jacoby, although the aedeagi are not alike. Both species have blue elytra but are unlike the rest of the similarly colored species in having a narrower head and prothorax with a broadened apical angle to the explanate margin and with an unusual notching behind the angle.

D. stenosticha is closely related to (if not identical with) *militaris* Jacoby, a Mexican and Central American species.

The remaining 10 species, which are not closely related to any others known to me, are: *punctigera*, *caroliniana*, *tenuicornis*, *figurata*, *arizonae*, *alabamiae*, *admirabilis*, *brevicornis*, *maritima*, and *funerea*.

GEOGRAPHIC VARIATION

On the Pacific coast there are representatives of only two groups of the vittate species of *Disonycha*, namely, the *alternata* and *pennsylvanica* groups, and the unique species *maritima*, which is not like any other known to me. *D. varicornis*, a species with blue elytra, reaches the Pacific coast, but is known only from Texas, southern California, and Lower California. All the other species of *Disonycha* are found east of the Rocky Mountains. Many species have a far wider range than has been supposed. As may be expected, species that range from New York to Arizona, such as *arizonae* and *latifrons*, show some variation in their different environments. This may be in size, in coloration, and even in punctuation, and it has led entomologists to describe as distinct species what are in real-

ity simply geographic races. The Atlantic coast specimens of *glabrata*, *arizonae*, *procera*, *fumata*, and *latifrons* are obviously different from the Arizona or Colorado ones, being either paler or darker in color, usually larger, and, in *glabrata* and *arizonae*, having deeper punctation; but specimens from intermediate localities are intermediate, and throughout the series the structural characters and aedeagus remain the same, so that the difference must be considered only varietal.

In other species of the genus the change in characters correlated with distribution has apparently gone a step further and becomes so great that distinct species have arisen. Such is the case in *limbicollis*. This species, which is confined to the Pacific coast, is plainly very closely related to *uniguttata*, and probably derived from it, but has developed certain distinctive characteristics that appear to be specific. This may be the case, also, in *latiovittata*, which occurs only in the Pacific and Northwestern States, and which is closely related to *alternata*.

In the *discoidea* group there seems to be an intermediate stage in the development of species. In this group the differences in coloration of specimens are very striking, but the shape, sculpture, aedeagus, and other structural characters are so similar that, aside from the coloring, the forms are difficult to differentiate. Possibly they are but varieties of a single species. *D. leptolineata* from Florida and *texana* from Texas, both closely related to *discoidea*, are doubtfully distinct. *D. antennata*, an entirely pale beetle, would be indistinguishable were it not for its entire lack of elytral vittae.

Some of the species with blue or green elytra, such as *xanthomelas*, *triangularis*, and *collata*, are widely distributed. In both *xanthomelas* and *collata* there is considerable variation in color, size, and degree of punctation, with the result that in each case two forms, based primarily on color differences and not structurally separable, have been described as species.

LIFE HISTORY

The life histories of four species of *Disonycha* have been published. F. H. Chittenden has given an admirable account of the eggs, larvae, and feeding habits of *xanthomelas*¹⁶ and a shorter account of the life history of *collata* (*mellicollis*)¹⁷ and also *glabrata*.¹⁸ H. Garman¹⁹ has also written a full account of the life history of *glabrata*. W. E. Whitehead²⁰ has made a careful study of the life history of *latifrons*.

¹⁶ Chittenden, U.S. Bur. Ent. Bull. 19, p. 80, 1899.

¹⁷ Chittenden, U.S. Bur. Ent. Bull. 82, p. 29, 1912.

¹⁸ Chittenden, Bull. Brooklyn Ent. Soc., vol. 17, p. 147, 1922.

¹⁹ Garman, 2d Ann. Rep. Kentucky Agr. Exp. Sta., p. 28, 1889.

²⁰ Whitehead, Nova Scotia Ent. Soc. Proc., 1918, p. 38.

The insect hibernates as an adult, and early in spring lays eggs in groups on its food plant or the nearby soil. In Nova Scotia, according to Whitehead, the eggs of *latifrons*, laid in April and May, did not hatch till June, while in Washington, D.C., the eggs of *xanthomelas* hatched in a week or 10 days, according to the temperature. Likewise the larval stage of *latifrons* in Nova Scotia was much longer, lasting from 50 to 55 days, and the pupal stage from 34 to 40 days. In the case of *latifrons*, the adult after emerging fed "voraciously for a month or 6 weeks and then entered the ground, vegetable matter, or rotten stumps where it hibernated." In more southern latitudes, as at Washington, D.C., or in Kentucky, the larval period is much shorter. In the case of *xanthomelas* and *glabrata*, it was only 3 or 4 weeks, and the pupal period about 3 weeks. The larvae feed usually on the lower surface of the leaves, often gregariously, at first eating holes and later stripping the leaves. When full grown they enter the ground to pupate. The number of generations of beetles probably varies also according to the length of the season.

MATERIAL EXAMINED

I have been fortunate in having a large series of most of the species to study at the United States National Museum, including many of Schaeffer's types. Besides this, I have had access to the LeConte, Blanchard, and Bowditch collections at Cambridge. I wish to thank the following who have sent me material for study: K. G. Blair, of the British Museum; E. T. Cresson, Jr., of the Academy of Natural Sciences of Philadelphia; Dr. T. H. Frison, of the Illinois State Natural History Survey; Prof. H. B. Hungerford and Warwick Benedict, of the University of Kansas; Prof. E. C. Van Dyke and E. P. Van Duzee, of the California Academy of Sciences; Prof. W. E. Whitehead, of MacDonald College; and C. A. Frost, Ralph Hopping, D. K. Duncan, H. R. Brisley, F. S. Carr, and H. P. Loding. I am also indebted to Dr. W. G. Kuntzen, of the Berlin Zoological Museum, and K. G. Blair, of the British Museum, for comparing specimens with type collections, and to H. S. Barber for his painstaking criticism.

KEY TO THE SPECIES OF DISONYCHA

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|---|-------------------------|
| 1. Elytra unicolorous, not vittate----- | 2 |
| Elytra vittate, with dark margin----- | 11 |
| Elytra vittate or with discoidal median spot, margin always pale----- | 12 |
| 2. Prothorax entirely dark----- | <i>funerea</i> (p. 61). |
| Prothorax yellowish, with or without spots or band, margin always pale----- | 3 |
| 3. Elytra yellow or yellow-brown----- | 4 |
| Elytra blue, purple, or green----- | 6 |

4. Prothorax with two dark spots anteriorly, elytra with very indistinct traces of sutural, median, and sometimes submarginal vittae; Arizona.
figurata (p. 35).
 Prothorax entirely pale or with vague reddish markings; North Carolina to Florida----- 5
5. Small (5 mm), elytra costate in female, usually traces of pale reddish pronotal spots, elytra pale reddish (in well-marked specimens paler yellow sutural, median, and marginal vittae); North Carolina to Florida.
conjugata (p. 14).
 Larger (6 to 7 mm), elytra not costate, entirely pale yellow, no trace of vittae; Florida Keys----- *antennata* (p. 46).
6. Head entirely pale, apical angle of lateral margin of prothorax unusually broad and notched behind the apex on margin; Texas, southern California.
varicornis (p. 60).
 Head entirely dark or bicolored----- 7
7. Head entirely dark----- 8
 Head bicolored----- 9
8. Head coarsely and densely punctate, ventral surface and legs entirely dark.
triangularis (p. 57).
 Head smooth, or with a few punctures across occiput and front, abdomen usually with pale margin or pale last ventral segment, sometimes entire abdomen pale, femora often pale at base----- *xanthomelas* (p. 55).
9. Femora bicolored, elytra very lustrous and densely punctate.
politula (p. 59).
 Femora pale, elytra not so lustrous and not densely punctate----- 10
10. Prothorax and elytra distinctly punctate; New Mexico and Colorado.
semicarbonata (p. 54).
 Prothorax and elytra finely and often indistinctly punctate; Kansas eastward----- *collata* (p. 52).
11. Shining, indistinctly punctate, femora and margin of abdomen usually pale; Atlantic coast to Arizona----- *glabrata* (p. 49).
 Only feebly shining, coarsely punctate, femora and abdomen dark; California and Nevada----- *maritima* (p. 51).
12. Elytra with broad discoidal dark spot----- *discoidea* (p. 43).
 Elytra vittate----- 13
13. Elytra pale with pale reddish or obsolete grayish vittae----- 14
 Elytra pale with dark brown or black vittae----- 15
14. Large (6 to 7 mm), elytra with obsolete or grayish vittae, no traces of costae, prothorax with 2 dark spots; Arizona, Nevada----- *figurata* (p. 35).
 Smaller (5 mm), elytra with pale reddish vittae, markedly costate in female, prothorax usually with pale reddish spots; North Carolina to Florida.
conjugata (p. 14).
15. Elytra with sutural and submarginal vittae, no median vitta or only traces of it----- 16
 Elytra with sutural and median vittae, no submarginal vitta or only indistinct traces of it----- 17
 Elytra with sutural, median, and submarginal vittae----- 21
16. Head pale except for narrow occipital band, tubercles sometimes dark and labrum usually brown----- *alternata* (p. 20).
 Head dark except about antennal sockets and sometimes a pale streak on lower edge of clypeus----- *limbicollis* (p. 19).
17. Prothorax without spots----- 18
 Prothorax spotted----- 19

18. Elytra distinctly punctate----- discoidea var. abbreviata (p. 44).
 Elytra very indistinctly punctate----- leptolineata (p. 44).
19. Head entirely pale, antennae unusually long and slender, extending fully to the middle of the elytra in female----- tenuicornis (p. 32).
 Head with labrum and sometimes tubercles and occiput dark, antennae not unusually long or slender and not extending to the middle of the elytra in female----- 20
20. Prothorax with distinct lateral callosities, head coarsely punctate.
 pluriligata (p. 25).
 Prothorax smooth, head smooth and shining except for a group of coarse punctures about fovea on each side----- figurata (p. 35).
21. Head entirely pale (sometimes tip of mandibles darkened)----- 22
 Head either entirely dark, or pale with occiput, tubercles, or labrum dark----- 24
22. Pronotum not distinctly spotted, elytra polished and with very narrow vittae, the sutural and submarginal vittae pale and somewhat indistinct; southern Texas----- stenosticha (p. 63).
 Pronotum distinctly marked with two anterior spots, elytra not polished, the vittae distinct and not unusually narrow----- 23
23. Antennae long and slender, extending beyond the middle of the elytra, elytra broadly oblong; Arizona----- tenuicornis (p. 32).
 Antennae not unusually long, scarcely reaching the middle of the elytra; elytra oblong oval; Massachusetts to Texas----- caroliniana (p. 33).
24. Head entirely dark except at base of antennal sockets----- 25
 Head not entirely dark----- 27
25. Small (5 to 6 mm), elytra markedly costate in female, very indistinctly punctate (see also description of dark variety of *procera*).
 pennsylvanica (p. 12).
 Larger (6 to 8 mm), elytra with only traces of costae in female, distinctly punctate----- 26
26. Aedeagus dark (see pl. 1, fig. 5); California----- limbicollis (p. 19).
 Aedeagus paler and slightly different in shape (see pl. 1, fig. 4); east of Rocky Mountains----- uniguttata (p. 17).
27. Prothorax more or less uneven, with lateral callosities, elytra more or less costate in female----- 28
 Prothorax always smooth and without depressions or callosities, elytra never costate in female----- 34
28. Head not densely or rugosely punctate, and with a broad dark occipital band extending to and often covering tubercles----- 29
 Head densely and usually rugosely punctate, and with at most only a narrow dark occipital band or spot, never extending to tubercles----- 30
29. Aedeagus with ventral lip tapering and acute (see pl. 8, fig. 42); Colorado.
 brevicornis (p. 62).
 Aedeagus with ventral lip broad, not tapering (see pl. 1, fig. 3); Atlantic coast to Rocky Mountains and Oregon----- procera (p. 15).
30. Prothorax densely and coarsely punctate; Pacific and Northwestern States.
 latiovittata (p. 23).
 Prothorax not so densely and rather indistinctly punctate----- 31
31. Elytra densely and sometimes confluent punctate----- 32
 Elytra not densely and not confluent punctate----- 33
32. Prothorax with distinct lateral callosities, not very convex, elytra coarsely and confluent punctate----- schaefferi (p. 24).
 Prothorax without distinct lateral callosities, convex, elytra densely but not so coarsely and not confluent punctate----- punctigera (p. 28).

33. Aedeagus with an acutely pointed dorsal tip (pl. 2, fig. 8) — *alternata* (p. 20).
Aedeagus with a broad dorsal tip (see pl. 2, fig. 9) — *pluriligata* (p. 25).
34. Median elytral vitta near submarginal vitta, with very narrow pale space between — *alabamae* (p. 47).
Median elytral vitta not conspicuously nearer to submarginal vitta than to sutural vitta — 35
35. Head with interantennal area and tubercles flat and smooth, tubercles not at all swollen, and indistinct — *latifrons* (p. 40).
Head with frontal carina and tubercles distinct — 36
36. Head, viewed from above, with interocular space half width of head — 37
Head, viewed from above, with interocular space more than half width of head — 38
37. Prothorax either entirely pale or with small median spot, occasionally with median spot and 2 lateral spots, all small, antennal joints not unusually long — *glabrata* (p. 49).
Prothorax with 2 anterior spots usually well marked, and often 2 lateral ones and median stripe; antennal joints 4 to 7 unusually long and subequal — *fumata* (p. 36).
38. Elytra distinctly and rather densely punctate — 39
Elytra indistinctly and finely but not densely punctate — 40
39. Submarginal elytral vitta never reaching apex to join with sutural vitta; aedeagus broad (see pl. 3, fig. 11) — *punctigera* (p. 28).
Submarginal elytral vitta joining at apex with sutural vitta; aedeagus narrow (see pl. 3, fig. 13) — *arizonae* (p. 29).
40. Head with broad dark occipital band, pronotum heavily marked with spots, the middle three sometimes coalescing, the lateral spots large; Colorado. *brevicornis* (p. 62).
Head never with occipital band, pronotum never with well-marked lateral spots — 41
41. Small (5 to 6 mm), usually without pronotal spots; Atlantic coast to Great Plains — *admirabilis* (p. 48).
Larger (6 to 7 mm), prothorax with 2 well-marked anterior dark spots; southern Arizona — *figurata* (p. 35).

DESCRIPTION OF SPECIES

1. *DISONYCHA PENNSYLVANICA* (Illiger)

PLATE 1, FIGURE 1

Haltica pensylvanica ILLIGER, Mag. für Insekt., vol. 6, p. 146, 1807 (Pennsylvania; type in Berlin University Zoological Museum).

?*Galleruca scxlineata* OLIVIER, Entomologie, vol. 6, p. 642, 1808 (Bengal).

Disonycha pensylvania STRUM, Catalogue, p. 283, 1943.—BLAKE, Bull. Brooklyn Ent. Soc., vol. 25, p. 210, 1930.

Disonycha pennsylvanica CROTCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 61, 1873.—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 202, 1889 (in part).

Disonycha pennsylvanica var. *parva* BLATCHLEY, Journ. New York Ent. Soc., vol. 29, p. 16, 1922 (Knox County, Ind.).

Description.—Small (5 mm), elongate oblong oval, shining, very finely punctate; elytra costate in female; head, legs, and body beneath dark except sides of prosternum and last ventral segment; prothorax with a single median spot, this sometimes broadening to

a wide band, elytra with wide and dark sutural, median, and submarginal vittae. Head with interocular space more than half width of head; frontal tubercles well marked, carina narrow, somewhat produced: surface smooth and shining, except a deep fovea surrounded by coarse punctures on each side near eye; usually entirely dark except the base of the antennae, but sometimes a narrow pale streak along lower edge of front. Antennae long (for the genus), dark, third and fifth joints subequal and shorter than fourth. Prothorax about twice as wide as long, nearly rectangular, with sides only slightly arcuate, not very convex and with a slight basal median depression; surface somewhat shining, under high magnification finely alutaceous and indistinctly punctate; pale with median dark spot, this sometimes broadening to form a wide band across pronotum, leaving margin always pale. Scutellum dark. Elytra oblong oval with parallel sides; not very convex, humeri marked by short intrahumeral sulcus; in the female 3 or 4 costae on each elytron, not so long or so prominent as in *conjugata*, these costae not apparent in the male; surface smooth, somewhat shining, under high magnification indistinctly alutaceous, and very finely punctate; pale with very broad sutural, median, and submarginal vittae, the submarginal and sutural usually broadly united at apex, the paler intervening vittae much narrower than the dark ones. Body beneath finely pubescent and entirely dark except the sides of the prosternum and the last ventral segment, sometimes margin of the penultimate segment also pale. Length, 5 to 6 mm; width, 2.8 to 3 mm.

Type locality.—Pennsylvania.

Distribution.²¹—Massachusetts (Framingham, Nantucket); New Jersey (Boonton); Maryland (Glen Echo); Virginia (Fredericksburg, Norfolk); North Carolina (Chadbourn); Florida (Bradenton, Capron, Crescent City, Daytona, Enterprise, Lake Harney, Lakeland, Key West); Illinois (Pulaski, Running Lake, Urbana); Alabama (Mobile); Louisiana (Mandeville, New Orleans); Texas (Avery, Dayton, Mineola).

Food plant.—*Polygonum* sp. (C. W. Johnson).

Remarks.—Although Illiger's description of *pennsylvanica* is unusually detailed and definite, this species has long been confused with two larger species, *uniguttata* and *procera*. It is usually smaller and darker than either of these, having an entirely dark head and legs, and the undersurface, except the last one or two ventral segments and sides of prosternum, is entirely dark. Unlike *uniguttata*, it has the elytral punctation very fine and indistinct. No specimens are yet known from west of the Mississippi River except in Louisiana and Texas.

²¹ The statements of distribution are based on specimens examined by the author.

The illustration and description of *Galleruca scalineata* in Olivier's Entomologie are suggestive of this species, but the habitat given is Bengal. Apparently Chevrolat in the Dejean Catalogue suspected that this species might be a North American *Disonycha*, since he lists it with a question mark. He had previously listed it in D'Orbigny's Natural History under *Disonycha*, and there is an old specimen of this species in the Bowditch collection that is labeled "*6-lineata* Oliv." followed by what appears to be the abbreviation "Ch."

Dr. W. G. Kuntzen, of Berlin University Zoological Museum, has corroborated my interpretation of the species by comparing specimens sent by me with the Illiger type.

2. DISONYCHA CONJUGATA (Fabricius)

PLATE 1, FIGURE 2

Galleruca conjugata FABRICIUS, Systema Eleutheratorum, vol. 1, p. 495, 1801 (Carolina; Mus. Bosc.).

Haltica conjugata ILLIGER, Mag. für Insekt., vol. 6, p. 184, 1807.

Altica conjugata OLIVIER, Entomologie, vol. 6, p. 686, 1808.

Disonycha conjugata CHEVROLAT, Dict. Univ. d'Hist. Nat., vol. 5, p. 81, 1849.—BLAKE, Bull. Brooklyn Ent. Soc., vol. 15, p. 211, 1930.

Monomacra costipennis JACQUELIN DU VAL, in Sagra's Hist. Fís. Cuba, vol. 7, p. 129, 1857 (Cuba).

Disonycha floridana JACOBY, Entomologist, vol. 34, p. 146, 1901 (St. Johns Bluff, east Florida; type in British Museum).

Disonycha pennsylvanica var. *conjugata* HORN, Trans. Amer. Ent. Soc., vol. 16, p. 203, 1889.

Description.—Small (5 mm), elongate oblong-oval, not very shining; elytra in female always markedly costate, less so in male; pale reddish yellow with paler yellow narrow elytral vittae; antennae, labrum, mesosternum and metasternum, sometimes middle of abdomen, tibiae and tarsi dark. Head with interocular space more than half width of head; frontal tubercles well marked, carina somewhat produced; surface smooth and shining except for a circle of coarse punctures about the fovea on each side of head near eye; labrum dark, occiput darker reddish. Antennae robust and long (for the genus), dark with paler basal joints; third joint shorter than fourth and fifth, which are subequal, the fourth being slightly longer. Prothorax about twice as wide as long, nearly rectangular in shape, with sides only slightly arcuate; not very convex, with slight lateral callosity and median basal depression; surface smooth and somewhat shining, under high magnification finely alutaceous and nearly impunctate; pale, usually with five indistinct pale reddish spots. Scutellum pale. Elytra narrowly oblong oval, with sides parallel and humeri marked by short intrahumeral sulcus; in female four or five costae extending from humeri well down toward apex, these costae less distinct or obsolete in male; surface somewhat shining, under high magnification very finely alutaceous and punctate; pale yellow with wide pale

reddish sutural, median, and submarginal vittae, these vittae so wide as to leave only narrow intervening vittae, the submarginal and sutural usually uniting at apex. Body beneath finely pubescent, pale with mesosternum and metasternum and often middle of abdomen dark; tibiae and tarsi also dark. Length, 4.4 to 5.5 mm; width, 2.2 to 3 mm.

Type locality.—"Carolina" (Bosc collection).

Distribution.—North Carolina, Georgia, Florida (Bradenton, Capron, Enterprise, Fort Myers, Jacksonville, Lake Harney, Lakeland, Lee County, Lake Poinsett, Miami, Moore Haven, Orlando, Paradise Key, Sanford); Cuba (Habana).

Food plant.—*Polygonum* sp. (H. S. Barber).

Remarks.—*D. conjugata*, one of the earliest species of *Disonycha* to be described, has been published under a number of names. Fabricius described it from a collection by Bosc from "Carolina" as *conjugata*. Old specimens in the LeConte collection and elsewhere are labeled with a Dejean Catalogue name signifying its reddish color. Jacquelin du Val described it from Cuba as *Monomacra costipennis*. Jacoby later described it from Florida as *floridana*, and it has been treated as a variety of *pennsylvanica* by Horn. Its yellowish or pale reddish elytra readily distinguish it from any other species of *Disonycha*. It is closely related to *D. pennsylvanica*.

3. DISONYCHA PROCERA Casey

PLATE 1, FIGURE 3

? *Haltica vicina* KIRBY, Fauna Boreali Amer., vol. 4, p. 217, 1837 ("Lat. 65°", Canada; type lost).

? *Disonycha limbicollis* var. *pallipes* CROUCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873 (type locality not recorded; type lost).

Disonycha procera CASEY, Contributions, pt. 2, p. 182, 1884 (Milford, Del.; type, U.S.N.M. No. 49223).—SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 282, 1931.

Disonycha pennsylvanica HORN, Trans. Amer. Ent. Soc., vol. 16, p. 202, 1889 (in part).

Disonycha pallipes BLAKE, Bull. Brooklyn Ent. Soc., vol. 25, p. 212, 1930 (not Crotch?).

Disonycha nigriventris SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 282, 1931 (Blitzen River, Oreg.; type in collection of Charles Schaeffer).

Description.—Elongate oblong-oval, somewhat shining; head usually with pale front, pronotum sometimes entirely pale, or in dark variety with five more or less coalescent spots; elytral vittae wide; femora and margin of abdomen usually pale except in dark western and southern specimens, in which the femora are sometimes entirely dark or partially dark. Head with interocular space more than half width of head; frontal tubercles well marked; carina slightly produced; surface usually smooth and shining, except a circle of coarse punctures about fovea on each side near eye and sometimes a fovea

in middle of vertex; dark with pale lower front, the tubercles, carina, and region about base of antennae paler. Antennae dark with paler basal joints, third and fifth joints subequal and shorter than fourth. Prothorax about twice as wide as long, almost rectangular, with sides slightly arcuate, not very convex, a slight trace of lateral callosity and median basal depression; surface finely alutaceous and finely punctate; often entirely pale, but in darker specimens with five spots, these sometimes banded together. Scutellum usually dark. Elytra with sides parallel, humeri marked by short intrahumeral sulcus; in female 4 or 5 costae, usually not so long or prominent as in *conjugata*; surface finely alutaceous and finely and rather sparsely punctate; wide sutural, median, and submarginal vittae, not united at apex. Body beneath finely pubescent, dark with margin of abdomen pale; femora usually pale, but in some specimens from Louisiana, Texas, Utah, Idaho, and Oregon the femora and abdomen dark or partially darkened. Length, 5.6 to 6.8 mm; width, 2.6 to 3 mm.

Type locality.—Milford, Del.

Distribution.—Maine (Paris, Wales); New Hampshire (Mount Washington); Massachusetts (Hatfield); New York (Long Island, New York City, West Point, Whiteface); Pennsylvania (Frankford, Hummelstown, North Mount); New Jersey (Clementon); Maryland (Beltsville, Chesapeake Beach, Patuxent River); District of Columbia; Virginia (Clarendon, Dyke, Mount Vernon); Georgia (Augusta); Louisiana (Mandeville, Morgan City, New Orleans); Texas (Beeville, Columbus, Victoria); Michigan (Detroit, Douglas Lake); Indiana (Knox); Illinois (Algonquin, Dubois, East St. Louis, Grass Lake); Minnesota (Fergus Falls, Mora); North Dakota (Bismarck); Kansas (Pawnee County, Reno County, Sylvania); Texas (Houston); Utah; Nevada; Colorado (Littleton); Idaho; Montana (Assiniboine, Gallatin Valley); Oregon (Blitzen River); British Columbia (Vernon); Alberta (Medicine Hat, Cypress Hills, Jenner); Saskatchewan (Oxbow); Manitoba (Aweme); Hudson Bay.

Food plant.—*Polygonum* sp. (D. H. Blake).

Remarks.—*D. procera*, another member of the *pensylvanica* group, is the species that in a previous paper²² I called *pallipes* Crotch. At that time I discussed the insufficiency of Crotch's description of *pallipes*, and based my interpretation of the species chiefly on that of Dr. E. A. Schwarz and Charles Schaeffer, as shown by labeled specimens, as well as on the fact that the species invariably had red legs in the east while *uniguttata* not infrequently had black legs. Mr. Schaeffer has since written me that although he had labeled specimens of the present species *pallipes*, he has of late decided that

²² Blake, Bull. Brooklyn Ent. Soc., vol. 25, p. 212, 1930.

Crotch's *pallipes* is *uniguttata* because of a character in Crotch's key—"thorax * * * with a marked callosity." Crotch's key is not a regularly constructed one with appositional statements, and either *uniguttata* or *procera* can be deduced from it. Therefore it seems best to regard *pallipes* Crotch as a doubtful species and apply Casey's name *procera* to the species under discussion.

This species, the type of which is a female, corresponding exactly to Casey's description, is usually smaller than *uniguttata* and has much finer punctation. The elytral costae are well developed in the female, which is not true of *uniguttata*. The prothorax has a slight trace of lateral callosity as in both *pennsylvanica* and *conjugata*, but this is not so well developed as in *uniguttata*. In markings it is very similar to *uniguttata*; the head is bicolored, the elytral vittae are wide, the legs and margin of the abdomen are red. The pronotum, however, in eastern specimens is often entirely pale, or with five indistinct spots. There is a dark variety of this species occurring in the Rocky Mountains and Northwestern States and also in Louisiana and Texas, in which the spots on the pronotum are often banded together, and the legs and undersurface are frequently dark or partially dark. These specimens are difficult to distinguish from *pennsylvanica* except by comparison of the aedeagi. Mr. Schaeffer has described this dark form as *D. nigriventris*, one paratype of which, a male, is in the United States National Museum. He states that the aedeagus is different from anything figured by me, but a dissected specimen that he has sent me shows that the aedeagus is not different from that of the eastern specimens of *procera*. My drawings of the aedeagi have been made for the most part from material soaked in caustic potash (which causes the softer membranes to become swollen), and later mounted in balsam. Mr. Schaeffer's dried specimen differs from the specimens mounted in balsam in being less swollen, owing to the different methods of preparation.

4. DISONYCHA UNIGUTTATA (Say)

PLATE 1, FIGURE 4

Altica uniguttata SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 4, p. 88, 1824 (United States; type lost).

? *Haltica vicina* KIRBY, Fauna Boreali Amer., vol. 4, p. 217, 1837 ("Lat. 65°", Canada; type lost).

Disonycha uniguttata MELSHEIMER, Catalogue, p. 122, 1858.—BLAKE, Bull. Brooklyn Ent. Soc., vol. 25, p. 212, 1930.—SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 282, 1931.

? *Disonycha limbicollis* var. *pallipes* CROTCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873 (type lost).—SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 282, 1931.

Disonycha pennsylvanica HORN, Trans. Amer. Ent. Soc., vol. 16, p. 202, 1889 (in part).

Description.—Elongate oblong oval, somewhat shining; elytra distinctly punctate; head sometimes entirely dark but usually pale in region about antennal sockets and lower front, pronotum usually with large median spot and two paler brown lateral spots, these sometimes banded together; elytra with wide sutural, median, and submarginal vittae, usually margin of abdomen and femora pale, but these sometimes also dark. Head with interocular space more than half width of head, frontal carina narrowly produced, tubercles well marked; surface generally smooth except for the coarse punctures about fovea on each side near eye and often a fovea in middle of vertex; usually black with a paler area about antennal sockets and lower front and a median dark streak on carina. Antennae dark with paler basal joints, robust, long for the genus, third joint shorter than fourth or fifth, which are subequal, the fourth slightly longer. Prothorax about twice as wide as long, slightly narrowed anteriorly with arcuate sides; not very convex, with a prominent callosity on either side and a median basal depression; surface alutaceous and finely punctate; pale, usually with a large median spot, wider anteriorly, and two paler lateral spots, sometimes all coalescing to form a wide band across pronotum, sometimes the lateral spots vanishing. Scutellum dark. Elytra with sides parallel, humeri marked by short intrahumeral sulcus; in female sometimes traces of costae, but these not so pronounced as in *conjugata*; surface alutaceous and distinctly and rather densely punctate; dark elytral vittae considerably wider than intervening pale one, the sutural and submarginal rarely united at apex. Body beneath finely pubescent, sometimes undersurface and legs entirely dark, but usually abdomen with a pale margin and femora pale. Length, 5.8 to 8 mm; width, 2.2 to 3.8 mm.

Type locality.—United States.

Distribution.—Massachusetts (Chicopee, Hopkinton, Natick, Wayland, Weston); Rhode Island (Watch Hill); New York (Staten Island, Whiteface); New Jersey (Boonton, Palisades); Pennsylvania; District of Columbia; Virginia (Arlington); Tennessee; Kentucky; Georgia; Florida (Gainesville); Louisiana (New Orleans); Michigan (Detroit, Monroe); Indiana (Hessville, Osborne, Pine); Illinois (Algonquin, Chicago, Devils Neck, Flag Lake, Forest City, Grass Lake, Griggsville, Havana, Normal, Quincy, Thompson Lake, Urbana); Wisconsin (Madison); Iowa (Ames); Missouri (Flat River, Kansas City, St. Louis); Kansas (Douglas County, Topeka); Nebraska; Manitoba (Treesbank, Winnipeg).

Food plant.—*Polygonum* sp. (C. A. Frost).

Remarks.—This species has been commonly called *pensylvanica* (usually but not originally spelled "*pennsylvanica*") but, although

allied to that species, it is a considerably larger insect with pronounced pronotal callosities and with distinctly punctate elytra. In coloring it usually differs from *pennsylvanica* in having a pale lower front, pale femora, and a pale margin to the abdomen, as well as three pronotal spots. Although Say gave as type locality the "United States", he described it in a paper on the insects collected on an expedition to the Rocky Mountains, and it was probably collected somewhere along the Platte River.²³ I have seen no specimens from west of Kansas and Nebraska. *D. pennsylvanica* is not known to occur west of the Mississippi, except in Louisiana and Texas.

Possibly this is the species that Crotch had in mind in his short description of *pallipes* (see previous discussion under *D. procera*). There is a dark eastern form of this in which the head, femora, and undersurface are entirely dark. It is merely a color form, as both dark and typically colored specimens are found in the same series. It is readily distinguished from the small *pennsylvanica* by its distinct elytral punctation. Say in his original description mentions a dark form as a variety that occurs "near the Rocky Mountains." *Disonycha limbicollis* (LeConte), described from Sacramento, Calif., may be only a dark Pacific coast variety of *uniguttata*, but several minor points of difference have led me to retain it as a distinct species.

5. DISONYCHA LIMBICOLLIS (LeConte)

PLATE 1, FIGURE 5

Haltica limbicollis LECONTE, Reports of explorations and surveys for a railroad route from the Mississippi River to the Pacific Ocean, vol. 9, no. 1, p. 67, 1857; vol. 12, pt. 3, p. 67, 1860 (Sacramento, Calif.; type in LeConte collection, Mus. Comp. Zool.).

Disonycha limbicollis CROUCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873.—BLAKE, Bull. Brooklyn Ent. Soc., vol. 25, p. 212, 1930.

Disonycha pennsylvanica var. *limbicollis* HORN, Trans. Amer. Ent. Soc., vol. 16, p. 202, 1889.

Description.—Elongate oblong oval, somewhat shining, elytra distinctly punctate; head dark, pronotum with a wide black band and pale margin, elytra with sutural, median, and submarginal vittae; undersurface and legs dark. Head with interocular space more than half width of head; carina narrowly produced, frontal tubercles well marked; surface smooth except for coarse punctures on each side about fovea, sometimes a small fovea in middle of vertex; entirely dark except sometimes a pale streak over labrum on lower edge of front. Antennae dark, third joint shorter than fourth or fifth, which are subequal, the fourth slightly longer. Prothorax about twice as wide as long, almost rectangular with sides only slightly arcuate, distinct lateral callosities on each side, and a

²³ See Barber, Ent. News, vol. 39, p. 15, 1928.

median basal depression; finely alutaceous and finely punctate; a broad dark band extending across pronotum leaving only the margin pale. Scutellum dark. Elytra narrowly oblong oval, humeri marked by a short intrahumeral sulcus; surface alutaceous and distinctly and quite densely punctate; dark sutural, median, and submarginal vittae, these not wider than pale intervening vittae; the median dark vitta frequently narrow, interrupted, or, even vanishing; sutural and submarginal vittae not uniting at apex. Body beneath finely pubescent, entirely dark, legs dark. Length, 6 to 8 mm; width, 2.5 to 3.8 mm.

Type locality.—Sacramento, Calif.

Distribution.—California (Lake County, Los Angeles, Los Gatos, Moorland, San Joaquin County, Santa Clara County, Stockton); Nevada (Elko).

Food plant.—*Polygonum* sp.

Remarks.—LeConte described this as similar to but narrower than *pensylvanica* (probably meaning *uniguttata*), and with the thorax sparsely punctured, the elytra not sulcate, and the yellow vittae broader. In the LeConte collection are four specimens bearing the gilt label indicating their locality as California, one of which is labeled *limbicollis*, and all of which fit LeConte's description. The chief points of difference between *limbicollis* and *uniguttata* appear to be in the generally somewhat narrower shape of *limbicollis*, its uniformly darker head and undersurface, and its slightly narrower elytral vittae, the median one of which is often interrupted or evanescent. The aedeagus is also slightly different. *D. limbicollis* may be only a dark variety of *uniguttata*, but because of its geographic isolation west of the Rocky Mountains, and the fact that *uniguttata* does not seem to be found beyond the Great Plains, it may best be regarded as a distinct species.

6. DISONYCHA ALTERNATA (Illiger)

PLATE 2, FIGURE 8

Haltica alternata ILLIGER, Mag. für Insekt., vol. 6, p. 144, 1807 (Carolina and Pennsylvania; type in Berlin University Zoological Museum).

? *Atica quinquevittata* SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 4, p. 88, 1824 (Missouri; type lost).

Disonycha alternata STURM, Catalogue, p. 283, 1843.—CROUCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873.

Disonycha quinquevittata HORN, Trans. Amer. Ent. Soc., vol. 16, p. 203, 1889 (in part).

Disonycha quinquevittata var. *punctigera* SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 279, 1931. (Not *D. punctigera* LeConte.)

Description.—Broadly oblong oval, moderately shining; pale, head with labrum, occiput, and usually tubercles brown; pronotum usually 5-spotted, sometimes only 2-spotted, elytra with narrow sutural,

median, and submarginal vittae, the median vitta tending to be evanescent in some specimens from Michigan and Illinois; metasternum and tibiae more or less dark and tarsi dark. Head with interocular space more than half width of head; interantennal space broad and somewhat produced; frontal tubercles well marked; occiput and front usually coarsely and often rugosely punctate; pale, usually with occiput and often tubercles and labrum darkened; labrum in some specimens from North Carolina and Georgia pale. Antennae robust, dark with paler basal joints, third and fifth joint subequal, the fourth slightly longer. Prothorax scarcely twice as wide as long, somewhat convex, with a callosity on either side in basal half and a slight median basal depression; somewhat narrowed anteriorly with arcuate sides; surface somewhat shining, under high magnification minutely alutaceous and finely and moderately densely punctate; pale with two anterior spots usually well marked, lateral ones and median stripe often paler brown, sometimes evanescent. Scutellum dark. Elytra with sides parallel, somewhat convex, humeri well marked with short intrahumeral sulcus; in female on lateral apical half a faint trace of ridging such as occurs in the *pensylvanica* group, but much shorter; surface finely alutaceous, finely and quite densely punctate; vittae narrow, the submarginal and sutural usually rather weakly uniting at apex; the median vitta in specimens from about Lake Michigan often interrupted, sometimes almost entirely disappearing. Body beneath densely and rather coarsely pubescent, pale with metasternum in part darkened, tibiae more or less dark, often pale with apex only dark, and tarsi dark. Length, 6.5 to 8.5 mm; width, 3.5 to 4.5 mm.

Type locality.—"Carolina" (as here restricted).

Distribution.—Maine (Monmouth, Paris); New Hampshire (Canaan Lake, White Mountains); Vermont (Bartlett, Burlington); Massachusetts (Andover, Chicopee, Framingham, Ipswich, Ludlow, Springfield, Wareham, Wilbraham); Connecticut; New York (Long Island); New Jersey (Clementon); Virginia (Nelson County); North Carolina (Dillsboro); South Carolina (Salem, Columbia, Newry); Tennessee; Louisiana (New Orleans); Illinois (Chicago, Grand Tower, Havana, Kahokia, Metropolis, Muncie, Topeka Beach, Waukegan); Indiana (Millers, Pine, Turkey Run); Ohio (Camp Perry, Columbus, Cincinnati); Michigan (Berrien Springs, Breedsville, Douglas Lake, Lewiston, Marquette, Monroe, Port Huron, Toledo Beach); Minnesota (Lake Pelican, St. Anthony Park); Wisconsin (Baldwin, Elkhorn, Hangen, Madison); South Dakota (Perkins County); Kansas (Douglas County, Ellis County, Hamilton County, Medora, Pawnee County, Rooks County, Russell County, Wichita); Nebraska (West Point); Oklahoma (Cleveland

County); Texas; New Mexico (Las Vegas, Santa Fe); Arizona (Oak Creek Canyon, White Mountains); Nevada (Ormsby County); Wyoming (Cheyenne, Laramie); Utah (American Fork, Coalville); Colorado (Antonito, Denver, Colorado Springs, Fort Collins, Greeley, Poudre Fork); Idaho (Blackfoot, Pocatello); Montana (Assiniboine, Billings, Bozeman, Glendive, Helena, Huntley); California, (Oakdale, Oil City, Kern County, Sacramento, Snelling); Nova Scotia (Truro); Ontario; Manitoba (Aweme, Onah); Saskatchewan; Mackenzie (Mackenzie River); Northwest Territories (Simpson); Alberta (Medicine Hat); British Columbia (Oliver, Osoyoos).

Food plant.—*Salix*.

Remarks.—This is one of the species that have been confused under the name of *D. quinquevittata* (Say) since Horn's revision of the genus. From Say's description of *quinquevittata* from Missouri, it is not clear which of several closely related species he had before him. Both *pluriligata* and the present species are found in Missouri, as well as *punctigera*, and Say's description applies equally well to all three. *D. pluriligata* is found in the Middle and Gulf States and westward but not north of Illinois. I have examined only one specimen from the East and this, labeled College Park, Md., collected by Duckett, is probably mislabeled, as much of Duckett's material was mounted after his death. *D. punctigera* is also a western species, not known east of Illinois. *D. alternata* was described by Illiger as coming "aus Carolina; Bosc d'Antic. Auf verschiednen Gartengewachsen in Pensylvanien; Pred. Melsheimer; Prof. Knoch." Although I have not seen the type of *alternata*, from comparisons made by Dr. W. G. Kuntzen with the Illiger specimens in the Berlin University Zoological Museum I have little doubt that the eastern species commonly called *quinquevittata* (Say) is the species described by Illiger. In the LeConte collection this species bears the label *alternata*. Dr. Kuntzen writes as follows of *alternata*:

Type and three paratypes, surely all the same, Carolina, Bosc d'Antic leg. * * * is in the sense of G. H. Horn (1889) a form of *5-vittata* Say * * * and is similar to the specimens named in the Berlin Museum as *D. punctigera* Leconte from Kansas, Hamilton County 3,350 feet F. H. Snow * * * [specimens of this same series from Hamilton County in the Snow collection have been examined and are what is here identified as *alternata* Illiger] * * * the black stripes of the elytra are narrow, there are only two distal spots on the pronotum, a posterior part of the metasternum of crescent shape is not at all or only a little darkened. Length, 7 to 8.5 mm.

D. alternata is found from Canada to Texas and from the Atlantic coast to British Columbia. In general it is a slightly larger and broader species than *pluriligata*, but so closely resembles it that often only an examination of the aedeagus will enable one to distinguish the two species.

Two specimens from Dillsboro, N.C., and a female in Mr. Schaeffer's collection from Fort Benning, Ga., are slightly smaller and paler, with the labrum pale, the pronotal spots not large, and the elytral vittae narrow. Dissection of the male from Dillsboro, N.C., shows that the aedeagus is identical with the larger and darker northern specimens.

7. DISONYCHA LATIOVITTATA Hatch

PLATE 2, FIGURE 6

Haltica puncticollis LeConte, Reports of explorations and surveys for a railroad route from the Mississippi River to the Pacific Ocean, vol. 9, no. 1, p. 67, 1857; vol. 12, pt. 3, p. 67, 1860 (Oregon and California; type in LeConte collection, Mus. Comp. Zool.) (Not *Haltica puncticollis* Kirby, 1837.)

Disonycha puncticollis Gemminger and Harold, Catalogus coleopterorum, p. 3497, 1876.—Gentner, Can. Ent., vol. 58, p. 149, 1926.

Disonycha quinquevittata Horn, Trans. Amer. Ent. Soc., vol. 16, p. 203, 1889 (in part).

Disonycha quinquevittata var. *puncticollis* Schaeffer, Journ. New York Ent. Soc., vol. 39, p. 280, 1931.

Disonycha latiovittata Hatch, Pan-Pacific Ent., vol. 8, no. 3, p. 108, 1932 (Nisqually, Washington; type in collection M. H. Hatch).

Description.—Broadly oblong oval, feebly shining, prothorax densely punctate; pale, head with labrum and often occiput dark, pronotum with 4 or 5 spots, elytra with sutural, median, and submarginal vittae, usually metasternum in middle, apex of tibiae, and tarsi dark. Head with interocular space slightly more than half width of head; carina not acute, broad and produced, frontal tubercles somewhat swollen, well marked; coarsely and rugosely punctate; pale, with labrum, sometimes also tubercles and occiput, dark. Antennae stout, dark with paler basal joints; third joint shorter than fourth or fifth, which are subequal, the fourth slightly longer. Prothorax twice as broad as long, not very convex, with callosity on each side on basal half and slight median depression near base; somewhat narrowed anteriorly with arcuate sides; surface alutaceous and densely punctate, not shiny; pale, generally with four spots, the median stripe usually either obsolete or reduced to a dot. Scutellum dark. Elytra broadly oblong, sides parallel somewhat convex, humeri well marked, with a distinct intrahumeral sulcus; surface alutaceous, somewhat shining, moderately coarsely and densely punctate; sutural and submarginal vittae usually joined at apex, vittae broad in Washington and Oregon specimens, but often rather narrow in California specimens, and in these the median vitta sometimes interrupted. Body beneath densely pubescent, pale, usually with the middle of metasternum, apex of tibiae, and tarsi dark. Length, 6 to 7.2 mm; width, 3.2 to 3.8 mm.

Type locality.—Nisqually, Wash., collected by Trevor Kincaid, August 23, 1931.

Distribution.—Washington (San Gabriel, Wawawai); Oregon (Corvallis, Freewater); California (Bartlett Springs, Camp Greeley, Castle Crag, Colton, Contra Costa, Dunsmuir, Fresno County, Garden Grove, Hayfork, Isabella, Kaweah, Los Alamitos, Los Angeles, Orange County, Pasadena, Paso Robles, Riverside, Santa Ana River, San Bernardino, San Diego, San Joaquin River, San Jose, Santa Monica, Sacramento, Sierra Nevada, Tulare County, Woyden, Yreka); Wyoming (Yellowstone National Park); British Columbia (Conford).

Food plant.—*Salix*.

Remarks.—The type of *Haltica puncticollis* LeConte is without doubt the specimen in the LeConte collection bearing the name and a gilt label indicating that it was collected in California. It fits LeConte's description, even to the dark coloring in the middle of the metasternum at the base (this coloring is more or less variable, but the entire metasternum is not dark in any specimen examined). Unfortunately, the name *puncticollis* has been previously used by Kirby in describing his *Haltica puncticollis*, which is now regarded as a synonym of *D. triangularis* (Say), and this has necessitated changing LeConte's very applicable specific name. In describing *D. latiovittata*, Hatch suggested that it might be identical with *puncticollis*, but that in any case the latter name was preoccupied. Specimens in the United States National Museum agreeing with his description and from Wawawai, Wash., one of the localities mentioned by Hatch in citing paratype specimens, have been compared by the writer with the type of *D. puncticollis* (LeConte) and found to be identical.

D. latiovittata is one of the species closely related to and usually confused with *alternata*. The aedeagus, however, differs considerably from that of *alternata*, being somewhat intermediate in shape between that species and *pluriligata*. *D. latiovittata* is distinguished by the densely and more coarsely punctate prothorax. The elytra also appear broader and more depressed than in *alternata*. The Washington and Oregon specimens usually have wide black elytral vittae and well-marked pronotal spots, but California specimens do not have unusually wide dark vittae; in fact, the median one is sometimes so narrow as to be interrupted, and the spots on the pronotum are less marked.

8. DISONYCHA SCHAEFFERI, new species

PLATE 2, FIGURE 7

Description.—Elongate oblong-oval, elytra coarsely and densely punctate, feebly shining; pale, head with slightly darkened labrum, often tubercles and occiput dark; prothorax with two well-marked spots anteriorly, and only a trace of lateral and median spots, elytra

with sutural, median, and submarginal vittae, metasternum in part, apex of tibiae, and tarsi dark. Head with interocular space more than half width of head; carina not acute, broad and produced; frontal tubercles somewhat swollen; coarsely and rugosely punctate on each side of front, with middle a little smoother; pale, the labrum, often tubercles, and occiput darkened. Antennae, stout, dark with paler basal joints, third joint shorter than fourth or fifth, which are subequal with the fourth slightly longer. Prothorax not twice as wide as long, somewhat convex, a callosity on either side and slight median basal depression; narrowed anteriorly with arcuate sides; surface alutaceous, moderately coarsely and rather densely punctate; pale with two well-marked anterior spots, the lateral spots and median stripe faint. Scutellum dark. Elytra oblong oval with parallel sides; somewhat convex; humeri well marked with a short intrahumeral sulcus; surface alutaceous, feebly shining, distinctly and densely, often confluent punctate; pale with narrow sutural, median and submarginal vittae, the sutural and submarginal weakly joined. Body beneath densely pubescent, pale with metasternum in part, apex of tibiae, and tarsi dark. Length, 7 to 8 mm; width, 3.6 to 4.2 mm.

Type.—Male and two female paratypes, U.S.N.M. No. 43649.

Type locality.—"Canada" (Wirt Robinson collection.)

Distribution.—"Canada"; Ohio (Cincinnati).

Food plant.—Unknown.

Remarks.—This species is related to *alternata* but easily distinguished from it by the coarse and dense punctation of the elytra. The aedeagus also differs from that of the rest of the *alternata* group, although bearing a resemblance to that of *alternata*. I take pleasure in dedicating this species to Charles Schaeffer, who has studied the genus *Disonycha* for many years. Mr. Schaeffer has sent me for examination from his collection two specimens of this species, both females, with the locality label Cincinnati, Ohio.

9. DISONYCHA PLURILIGATA (LeConte)

PLATE 2, FIGURE 9

?*Altica quinquevittata* SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 4, p. 88, 1824 ("Missouri"; type lost).

Haltica pluriligata LECONTE, Proc. Acad. Nat. Sci. Philadelphia, vol. 4, p. 27, 1858 (Kansas and Texas; type in LeConte collection, Mus. Comp. Zool.).

Disonycha pluriligata LECONTE, Smithsonian Contr. Knowl., vol. 11, p. 25, 1859.

Disonycha quinquevittata HORN, Trans. Amer. Ent. Soc., vol. 16, p. 203, 1889 (in part).—JACOBY, Biol. Centr. Amer., vol. 6, suppl., p. 276, 1891.—SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 279, 1931.

Description.—Elongate oblong oval, somewhat shining; pale, head with occiput, labrum, and often tubercles darker, pronotum usually 5-spotted, lateral spots sometimes evanescent, elytra with sutural,

median, and submarginal vittae, metasternum in part, apex of tibiae, and tarsi dark. Head with interocular space slightly more than half its width; tubercles distinctly marked, carina not acute, broad, and slightly produced; coarse punctures about fovea on each side of head near eye, but median space usually smooth; pale with labrum, usually tubercles, and occiput darker. Antennae robust, dark with paler basal joints, third joint shorter than fourth or fifth, which are subequal, the fourth longer. Prothorax not twice as wide as long, narrowed very little anteriorly with only slightly arcuate sides; not very convex; a slight callosity on either side on basal half and a median basal depression; surface alutaceous and finely punctate; pale with five spots, sometimes lateral spots and median stripe evanescent. Scutellum dark. Elytra with parallel sides, somewhat convex, humeri well developed and an intrahumeral sulcus; on lateral apical half a trace of the ridges characteristic of the *pensylvanica* group, and slightly more developed than in *alternata*; surface alutaceous and finely punctate; vittae usually wider than in *alternata* except in the southwestern specimens, and the sutural and submarginal often rather feebly joined at apex. Body beneath densely and somewhat coarsely pubescent, pale with metasternum in part, usually the middle, dark; apex of tibiae and tarsi dark. Length, 6.8 to 7.8 mm; width, 3.5 to 4.4 mm.

Type locality.—Kansas (as here restricted).

Distribution.—Tennessee; Illinois (Elizabethtown, East St. Louis, Grafton, Grand Tower, Kahokia, Metropolis, Peoria, Quincy); Kansas (Topeka); Missouri; Arkansas (Texarkana); Oklahoma (Cleveland County); Texas (Brownsville, Columbus, Dallas, Del Rio, Laredo, Wellborn); Louisiana (Baton Rouge, Mandeville); Colorado (Boulder).

Food plant.—*Salix*.

Remarks.—The specimen labeled *pluriligata* in the LeConte collection also bears a green label, indicating that it is probably the Kansas specimen mentioned in the original description. It fits the description and may be considered the type. In most collections *pluriligata* is confused with *alternata*. As LeConte states, *pluriligata* is "allied to *alternata*, but narrower and with a less transverse thorax." It is very difficult, however, to distinguish the two species in many instances, and the only certain means is to dissect for the aedeagus, that of *pluriligata* having a broad tip quite different from the acute tip of *alternata*. In general, *pluriligata* is more elongate, has a smoother head, the prothorax is narrower, the elytral vittae are wider, and the elytral ridging in the female is more pronounced. Its range, also, is more southern, no specimens being as yet known from Canada, New England, or the Northwestern States. I have seen

only one specimen east of Tennessee, and this is a specimen labeled College Park, Md., collected by Duckett (see notes under *alternata*); the accuracy of this label is open to considerable doubt.

DISONYCHA PLURILIGATA var. PURA (LeConte)

PLATE 2, FIGURE 10

Haltica pura LECONTE, Proc. Acad. Nat. Sci. Philadelphia, vol. 4, p. 86, 1858 (Colorado River, California; type in LeConte collection, Mus. Comp. Zool.).

Disonycha pura LECONTE, Smithsonian Contr. Knowl., vol. 11, p. 25, 1859.

Disonycha capitata JACOBY, Biol. Centr. Amer., vol. 6, pt. 1, p. 316, 1884. [No type locality designated, but these localities given: Mexico (North Sonora, Tuxtla, Cosamaloapam); Guatemala (Zapote Panzos).]

Disonycha quinquevittata var. *pura* HORN, Trans. Amer. Ent. Soc. vol. 16, p. 315, 1889.—? var. *pura* SCHAEFFER, Journ. New York Ent. Soc., vol. 27, p. 334, 1919.—var. *pura* SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 380, 1931.

Disonycha quinquevittata JACOBY, Biol. Centr. Amer., vol. 6, suppl., p. 276, 1891.

Description.—Usually smaller and paler than *pluriligata*, the pronotum not so heavily marked with spots, sometimes 4, but often only 2 anterior spots; the elytra with narrower vittae, and the submarginal one frequently very poorly defined; the body beneath sometimes entirely pale or with slight darkening in middle of metasternum. Length, 6.5 to 7.5 mm; width, 3.5 to 4 mm.

Type locality.—Colorado River, Calif.

Distribution.—Arizona (Globe, Nogales, Oak Creek Canyon, Phoenix, River Camp, Santa Cruz River, White Mountains, Yuma); New Mexico (Albuquerque); California (Calipatria, Colton, Colorado River, Imperial County, Needles, Pomona, Riverside, Yuma).

Food plant.—*Salix exigua* (D. K. Duncan).

Remarks.—The specimen labeled *pura* in the LeConte collection also bears a gilt label indicating that it was collected in California, and therefore may be considered the type. LeConte separated *pura* from *pluriligata* by its slenderer form and the uniform yellow color of the undersurface. These differences in general hold, but *pura* is only a pale, attenuated southwestern variety of *pluriligata*, as dissection reveals. The aedeagus is indistinguishable from that of the larger, more heavily marked Kansas and Texas specimens.

Jacoby dwelt upon the prominences of the thoracic tubercles in his description of *capitata*. In reality these callosities are not much more marked than in most of the *alternata* group, but the lack of coloring on the paler, arid country specimens accentuates these prominences. Jacoby states that it ranges as far south as Guatemala. Probably there is a confusion of more than one species in Jacoby's type series of *capitata*. The specimens from "North Sonora, Mexico" (=Arizona) collected by Morrison, some of which now in the

Museum of Comparative Zoology were purchased from Jacoby by Bowditch, are identical with LeConte's type of *pura*. I believe that these are some of the cotypes of *D. capitata* and designate "North Sonora" (i.e., Arizona) as the type locality.

10. *DISONYCHA PUNCTIGERA* LeConte

PLATE 3, FIGURE 11

? *Altica quinquevittata* SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 4, p. 88, 1824 ("Missouri"; type lost).

Disonycha punctigera LECONTE, Smithsonian Contr. Knowl., vol. 11, p. 24, 1859 (Kansas, near the Rocky Mountains; type in LeConte collection, Mus. Comp. Zool.).

Disonycha quinquevittata HORN, Trans. Amer. Ent. Soc., vol. 16, pp. 203, 315, 1889 (in part).

Disonycha neglecta SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 283, 1931 (Kansas; type in collection of Charles Schaeffer).

Disonycha punctipennis SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 284, 1931 (Lake Okoboji, Iowa; type, U.S.N.M. No. 44118).

Description.—Broadly oblong oval, feebly shining, elytra densely punctate; pale, occiput darkened, pronotum with 4 or 5 spots, elytral vittae narrow, metasternum, apex of tibiae, and tarsi dark. Head with interocular space more than half width of head; interantennal area broad, slightly produced, tubercles not swollen but distinctly marked; surface generally smooth and shining in middle with some punctures, coarse but not confluent, on each side about fovea near eye; posterior edge of occiput, usually tubercles, often a streak down carina, and labrum dark. Antennae dark with paler basal joints, third joint shorter than fourth or fifth, which are subequal, the fourth slightly longer. Prothorax scarcely twice as wide as long, convex without depressions, narrowed anteriorly with arcuate sides; surface alutaceous with fine punctation; pale, usually with four spots, the median stripe more or less obsolete or reduced to a spot. Scutellum dark. Elytra broadly oblong oval, convex, humeri marked by a short intrahumeral sulcus; surface alutaceous, distinctly and closely punctate; vittae narrow, submarginal and sutural not united at apex, usually submarginal not extending beyond median at apex. Body beneath finely pubescent; pale, with middle of metasternum and apex of tibiae and tarsi darkened. Length, 6.3 to 7.6 mm; width, 3.3 to 4.4 mm.

Type locality.—"Kansas near the Rocky Mountains."

Distribution.—Illinois (Fort Sheridan); Kansas (Onaga, Reno County, Riley County, Sylvia, Topeka); Nebraska (Lincoln); Iowa (Lake Okoboji); South Dakota (Madison); Montana (Billings); Colorado (Mancos, Platte Canyon); New Mexico (Aztec); Alberta (Edmonton).

Food plant.—Unknown.

Remarks.—In the LeConte collection are 3 specimens of this species, 1 of which is labeled *H. punctigera* and all of which bear the green circle label indicating that they are from the region given as the type locality. Following these three specimens are several others not of this species, but *arizonae*, and not fitting LeConte's description. In his description LeConte differentiated this species clearly from others closely resembling it. According to the original description, *punctigera* is broader proportionately than any of the *alternata* group, the prothorax is more convex, lacking the depressions such as are found in the *alternata* group, and the elytra are strongly and densely punctured. Moreover, the submarginal and sutural vittae, as he also states, are not at all joined, in this respect differing from *arizonae*. In short, *punctigera*, although at first glance resembling *alternata*, is not related to it. The head is smoother, the prothorax and elytra are differently shaped and lack depressions, and the aedeagus is unlike that of *alternata*, but resembles somewhat that of *D. caroliniana*, an oval species. Possibly this is the species described by Say as *A. quinquevittata* (see p. 65).

Mr. Schaeffer has sent me a paratype of *D. neglecta* from Kansas, which he has donated to the National Museum (no. 44116). It is a male and has been preserved for some time in alcohol and is therefore paler, but in no other way separable from typical specimens of *D. punctigera* LeConte. A type (male) and three paratypes (1 male and 2 females) of *D. punctipennis* in the United States National Museum are identical with typical specimens of *D. punctigera*. Apparently, although Mr. Schaeffer has recognized the species, he has never connected LeConte's name *punctigera* with it, but has considered *alternata* as *punctigera*. This is shown by species labeled *D. punctigera* by him in the National Museum, which are *alternata*, and by his most recent paper on *Disonycha* (1931).

11. DISONYCHA ARIZONAE Casey

PLATE 3, FIGURE 13

Disonycha arizonae CASEY, Contributions, pt. 1, p. 52, 1884 (Arizona; type U.S.N.M. No. 49225, Casey collection).—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 206, 1889.

Disonycha glabrata JACOBY, Biol. Centr. Amer., vol. 6, pt. 1, p. 311, 1884 (in part).

Disonycha davisi SCHAEFFER, Journ. New York Ent. Soc., vol. 32, p. 141, 1924 (Anglesea, N.J.; type, U.S.N.M. No. 42426).

Description.—Oblong, feebly shining, with moderately densely punctate prothorax and elytra; pale, usually with a small dark spot on occiput and dark labrum, tubercles sometimes dark, two anterior spots on prothorax, and sutural, median, and submarginal elytral vittae; apex of tibiae and tarsi dark. Head with interocular space

more than half width of head; frontal carina not acute, broad and somewhat produced, tubercles well marked but flat; middle of occiput and front usually smooth with some coarse punctures about fovea near eye; pale, with often a small spot in middle of occiput, the tubercles frequently brown and the labrum always dark. Antennae short, dark with paler basal joints, third, fourth, and fifth joints subequal, the fourth slightly the longest, the remainder nearly as broad as long. Prothorax a little over twice as wide as long; somewhat convex, a little narrowed anteriorly, with sides arcuate; surface more or less distinctly and quite densely punctate, alutaceous; pale with two anterior spots, not close together and somewhat oblique, with anterior ends approximate. Scutellum dark. Elytra broadly oblong oval, convex, with humeri not prominent and without intrahumeral sulcus; surface alutaceous, somewhat shining, densely and often coarsely punctate; sutural, median, and submarginal vittae only moderately wide, the submarginal uniting with sutural at apex. Body beneath usually finely and densely pubescent, but in Arizona specimens only sparsely pubescent; entirely pale, the apex of tibiae and tarsi brown, and sometimes the middle of the anterior femora with a brown marking. Length, 4.6 to 6.5 mm; width, 2.6 to 3.2 mm.

Type locality.—Arizona, collected by H. K. Morrison.

Distribution.—Maine (Monmouth, Paris, Wales); Massachusetts (Chicopee, Malden, Springfield); Connecticut (Meriden); Rhode Island (Providence); New York; New Jersey (Anglesea, Boonton, Troy Hill); Pennsylvania (Frankford); Maryland (Odenton); District of Columbia; Virginia (Falls Church); Tennessee (Elmwood); South Carolina (Clemson College); Illinois (Anna, Billets Station, Bloomington, Champaign, Normal, Urbana); Iowa (Iowa City); Missouri (Virgil City); Nebraska (Lincoln, Malcolm); Kansas (Douglas County, Garden City, Onaga, Riley County, Topeka); Texas (Alpine, Brownsville, Cypress Hills, Devils River, Sabinal, San Antonio, San Diego); Arizona (Baboquivari Mountains, Cochise County, Douglas, Fort Grant, Gila County, Huachuca Mountains, Nogales, Oak Creek Canyon, Palmerly, Pinal Mountains, Santa Cruz County, Santa Rita Mountains, Sierra Anche); New Mexico (Las Vegas); Manitoba (Aweme).

Food plants.—Potato, *Solanum tuberosum* (Blanchard); Russian-thistle, *Salsola pestifer* (in New Mexico).

Remarks.—The type series of this species consists of two specimens, both females, in the Casey collection, which correspond with Casey's precise description of *arizonae*. There is also a set in the National Museum collection labeled "Arizona, Morrison", which probably is from the same series. Still another specimen of the same series in the National Museum, mounted on a pin with a specimen of *glabrata*

with the locality label "N. Sonora, Mexico, Morrison", from the *Biologia material*, has been identified, presumably by Jacoby, as *glabrata*.

This species of *Disonycha* is one of the most widespread over the United States, being found in the east from Maine to Texas and westward to Arizona. It also occurs in Canada. It is distinguished by the oblong shape, the rather closely punctate pronotum and elytra, the two somewhat distant pronotal spots, the short, robust antennae, and pale undersurface. In size and punctuation it is somewhat variable. Casey's Arizona specimens differ from Schaeffer's eastern specimens (*davisi*) very little except in degree of coloration and elytral punctuation, the Arizona ones being paler and not so deeply punctate and therefore with smoother and more shining elytra. The undersurface of Casey's specimens is also less pubescent (the more sparsely punctate ventral surface is Schaeffer's chief distinction between *davisi* and *arizonae*). I can find no difference in the aedeagi in specimens from Massachusetts, Tennessee, Texas, and Arizona. As a rule, the northern specimens are larger, of darker coloring, and more heavily punctate. A series from Tennessee and some from Texas are small with the elytra densely but not deeply punctate. Another series from Batchawana Bay, Lake Superior, Ontario, comprising the largest of the specimens, is so coarsely punctate as to be confused with *punctigera*; in fact, this species is confused with *punctigera* in the series of the LeConte collection under *punctigera* (see notes under that species). It differs from *punctigera* in the shape of the aedeagus and in having the submarginal and sutural vittae united at the apex. This Lake Superior series is the most divergent of all the specimens examined and deserves a varietal name.

DISONYCHA ARIZONAE BOREALIS, new variety

PLATE 3, FIGURE 14

Description.—Of same shape and coloring as *arizonae* but with much coarser and deeper pronotal and elytral punctuation; fourth antennal joint distinctly longer than third or fifth; aedeagus (see pl. 3, fig. 14) of same general shape as in *arizonae*, but with minor differences. Length, 5.5 to 6.8 mm; width, 3 to 3.5 mm.

Type.—Male and 7 paratypes (5 female, 2 male), U.S.N.M. No. 43650.

Type locality.—Batchawana Bay, Lake Superior, Ontario, collected by H. G. Hubbard and E. A. Schwarz.

Other locality.—Marquette, Mich.

The type series was listed by Hubbard and Schwarz (*Proc. Amer. Philos. Soc.*, vol. 17, p. 640, 1878), from Bachewauung Bay (spelling recently changed on maps) and Marquette under the specific name *punctigera* as determined by LeConte.

12. *DISONYCHA TENUICORNIS* Horn

PLATE 3, FIGURE 12

Disonycha tenuicornis HORN, Trans. Amer. Ent. Soc., vol. 16, p. 208, 1889
(southern Arizona; type in Horn collection, Acad. Nat. Sci., Philadelphia).

Description.—Broadly oblong oval, moderately shining, pale with two anterior dark pronotal spots, and very narrow dark median elytral vitta and narrowly darkened sutural edges, the submarginal vitta usually being only faintly indicated; antennae unusually long and slender, extending fully half the length of the elytra in the female (longer in the male). Head with interocular space more than half width of head; interantennal area broad and flat, frontal tubercles scarcely marked, occiput and front smooth and shining, only a few scattered punctures on either side about fovea near eye; head entirely pale. Antennae dark with paler basal joints; long and slender, extending fully half length of elytra, third joint a little shorter than fourth and fifth, which are subequal, the fourth slightly longer, sixth and seventh nearly as long. Prothorax not twice as broad as long, nearly rectangular with sides only slightly arcuate, somewhat convex; shining, almost impunctate; pale with two anterior dark spots. Scutellum dark brown. Elytra somewhat convex, oblong, with humeri not prominent and with little trace of an intra-humeral sulcus; moderately shining, under high magnification finely alutaceous and finely punctate; pale with unusually narrow median vitta, sutural vitta usually consisting of scarcely more than darkened sutural edges, submarginal vitta poorly defined, more distinct and wider at apex and uniting with sutural vitta. Body beneath densely covered with fine pubescence, entirely pale, legs pale with a darkened streak on outside of femora, tarsi brown. Claws with basal tooth much longer than in other species of the genus. Length, 6 to 7.6 mm; width, 3 to 4.5 mm.

Type locality.—Southern Arizona; type collected by H. K. Morrison.

Distribution.—New Mexico (Alamogordo, Organ Mountains); Arizona (Chiricahua Mountains, Cochise County).

Food plant.—Unknown.

Remarks.—*Disonycha tenuicornis*, a species so far found only in New Mexico and Arizona, is unusual in having long and very slender antennae. It is broadly oblong with a broad head, and the elytra have very narrow vittae. In the specimens examined, the male is considerably smaller than the female. I have seen only a few specimens, and since the species is apparently rare, these deserve particular mention. I have examined three specimens in Horn's collection, 2 from Alamogordo, N. Mex., and 1 from Arizona; 1 in

the collection of Ralph Hopping from Cochise County, Ariz.; and 2 in the National Museum, from the Organ Mountains, N. Mex., and Chiricahua Mountains, Ariz.

13. DISONYCHA CAROLINIANA (Fabricius)

PLATE 3, FIGURE 16

Crioceris caroliniana FABRICIUS, Systema entomologiae, p. 122, 1775 (Carolina; Drury collection; type apparently lost).

Chrysomela caroliniana FABRICIUS, Mantissa insectorum, vol. 1, p. 75, 1787.

Galleruca caroliniana FABRICIUS, Entomologia systematica, pt. 2, p. 24, 1792; Systema Eleutheratorum, vol. 1, p. 491, 1801.

?*Cistela vittata* FABRICIUS, Entomologia systematica, pt. 2, p. 47, 1792.

?*Cistela vittata* FABRICIUS, Systema Eleutheratorum, vol. 1, p. 491, 1801.

?*Altica caroliniana* OLIVIER, Encyclopédie méthodique, vol. 4 (vol. 1, Insects), p. 105, 1789; Entomologie, vol. 6, p. 684, 1808.

?*Haltica caroliniana* ILLIGER, Mag. für Insekt., vol. 6, p. 144, 1807.

Disonycha caroliniana CHEVROLAT, Dejean Catalogue, p. 414, 1837.—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 315, 1889.

Disonycha quinquevittata FABRICIUS, in Gemminger and Harold, Catalogus coleopterorum, p. 3497, 1876.

Disonycha pulchra CASEY, Contributions, pt. 1, p. 51, 1884 (Chester, Pa.; U.S.N.M. No. 49224, Casey collection).

Disonycha alternata HORN, Trans. Amer. Ent. Soc., vol. 16, p. 315, 1889 (as synonym; not *H. alternata* Illiger).

Description.—Oblong oval, smooth, somewhat shining; pale with darker antennae, two pronotal spots, placed near anterior margin, dark sutural, median, and submarginal elytral vittae and dark tibiae and tarsi. Head with interocular space considerably more than half width of head; interantennal area scarcely carinate, broad; tubercles not swollen; surface smooth except for a few punctures on each side about fovea; entirely pale. Antennae dark with basal joints a little paler, third, fourth, and fifth joints subequal, the fourth slightly the longest. Prothorax fully twice as broad as long, narrowed anteriorly with arcuate sides; convex; surface shining, very indistinctly punctate; pale with two spots placed near anterior margin, these spots occasionally large and in one specimen coalescing. Scutellum broadly triangular, dark. Elytra oblong oval, sides rounded, humeri not pronounced or marked by intrahumeral sulcus; surface somewhat shining, under high magnification minutely alutaceous and finely and indistinctly punctate; sutural and submarginal vittae narrow and usually not quite uniting at apex, median vittae only moderately wide. Body beneath finely but not conspicuously pubescent; entirely pale except the darkened tibiae and tarsi, frequently only apex of tibiae dark. Length, 5.8 to 6.5 mm.; width, 3.2 to 3.8 mm.

Type locality.—"Carolina."

Distribution.—Massachusetts (Chicopee, Cambridge, Framingham, Lynn Beach, Springfield); New York; Connecticut (Lyme); Pennsylvania (Chester); Maryland (Bladensburg, Glen Echo); Virginia (Camp Humphreys, Virginia Beach); North Carolina; Georgia (Thomasville); Florida (Capron, Enterprise, Haulover, Jacksonville, Miami, Sanford); Louisiana (Covington); Texas (College Station); Oklahoma (Osage County); Illinois (Meredosia).

Food plant.—Unknown. (Fabricius, 1801, gave the food plant as *Amaranthus spinosus*, but confusion between this species and *glabrata* may have occurred at that time.)

Remarks.—The type of Fabricius' species, described from the Drury collection, seems to have been lost. K. G. Blair, of the British Museum, has lent me for examination a specimen determined as *caroliniana*, "the determination of which is probably more or less traditional", that agrees with specimens compared by Dr. W. G. Kuntzen, of the Berlin University Zoological Museum. Doctor Kuntzen writes that in the Berlin Museum are six specimens under the name *caroliniana* received from Fabricius himself, all of which agree with the meager description of *caroliniana*. Illiger, as Doctor Kuntzen writes, with little doubt described a different species under the name *caroliniana*. Probably Olivier also had a different species or confused two species under *caroliniana*. According to Olivier's description the pronotum is sometimes immaculate and sometimes has two spots, and in his illustration the pronotum is without markings. No specimen of *caroliniana* that I have examined is without the anterior pronotal spots. It is possible that Olivier had before him the smaller, oval species described by Blatchley as *admirabilis*. The illustration fits that species, and in many collections *admirabilis* is labeled *caroliniana*, mainly, I believe, on account of Olivier's illustration.

D. caroliniana, which is rather poorly represented in most collections, appears to inhabit the coastal region from Massachusetts to Texas. I have seen one specimen from Oklahoma and one from Illinois. It is very much like the pale form of *fumata*, described by Schaeffer as *lodingi*, but can be distinguished from that by its shorter and subequal third, fourth, and fifth antennal joints, and its entirely pale head, as well as by its shorter and broader prothorax. It is larger than *admirabilis*, and always has two anterior pronotal spots, which are not usually present in *admirabilis*. The eastern variety of *latifrons*, described by Schaeffer as *laticollis*, is usually larger and darker, the labrum and frequently the metasternum being dark. The aedeagus of *caroliniana* is not like that of any other North American species of *Disonycha*.

D. pulchra was described by Casey from two fresh specimens of this species, both females, collected near Chester, Pa. The live

beetles are much brighter in coloring. Casey's beetles now have the usual appearance of dried museum specimens of this species.

14. DISONYCHA FIGURATA Jacoby

PLATE 3, FIGURE 15

Disonycha figurata JACOBY, Biol. Centr. Amer., vol. 6, pt. 1, p. 314, 1884 (type not designated; Mexico to Panama).

Description.—Broadly oval, feebly shining, pale yellow; prothorax with 2, rarely 4 dark spots anteriorly; elytra with usually indistinct sutural, median, and submarginal vittae, occasionally these vittae dark brown and well marked. Head with interocular space more than half width of head; interantennal area broad, scarcely carinate, a group of punctures about fovea on each side near eye; head smooth, shining and entirely pale except for the brown labrum and occasionally slightly darkened frontal tubercles. Antennae piceous, fourth joint longer than third or fifth. Prothorax less than twice as broad as long, convex, narrowed anteriorly with slightly arcuate sides; shining, indistinctly and sparsely punctate; pale with 2 anterior dark spots, occasionally, in darker specimens, with 4 spots and a trace of a median line. Scutellum brownish. Elytra oval, somewhat convex, with humeri not prominent; surface shallowly, closely, and rather indistinctly punctate; pale yellow with usually indistinct and narrow sutural, median, and submarginal vittae, the submarginal and sutural vittae tending to unite at apex; in darker specimens the vittae sometimes stronger and brownish. Body beneath pale with middle of metasternum and occasionally middle of abdomen dark, a streak, sometimes a darkened area, on femora, and the apex of tibiae and tarsi dark. Length, 6.2 to 7 mm; width, 3.2 to 3.5 mm.

Type locality.—Not designated; the following localities given: Mexico (Ventanas, Cerro de Plumas, Oaxaca, Juquila, Cordova, Playa Vicente, Tuxtla, Capulalpam, Guanajuato); Guatemala (Capetillo, Duenas, Chacoj); Panama (Bugaba).

Distribution.—Nevada (Hot Springs); Arizona (Nogales, Patagonia, Santa Rita Mountains). Mexico to Panama.

Food plant.—Unknown.

Remarks.—This species, described by Jacoby from Mexico, Guatemala, and Panama, has been collected in the United States in Nevada and Arizona. It is remarkable on account of its pale and ill-defined elytral vittae, often so indistinct that the elytra appear entirely pale yellow-brown. Occasionally, in a darker specimen, the vittae are distinct enough to make the species easily confused with *latifrons* or even *fumata*, but the paler undersurface and the shape of the aedeagus distinguish these darker forms. It is quite distinct from any other North American species, in spite of Jacoby's statement

that he had "not much doubt that the insect is but a pale or maybe immature form of *D. alternata* or an allied species."

I am indebted to Dr. E. C. Van Dyke for the opportunity to examine a series of specimens taken by E. P. Van Duzee at Patagonia, Ariz., a small station on the southeast slope of the Santa Rita Mountains, on August 2, 1924, two of which Dr. Van Dyke has donated to the collection of the National Museum. The species was described from 13 localities between Ventanas, Mexico (Durango?) and Bugaba, Panama, and no type locality is designated. This is the first record of its occurrence in the United States.

Mr. Schaeffer has sent me two unidentified specimens of this species from his collection from Nogales, Ariz., and Hot Springs, Nev. In the latter specimen the elytral vittae are fully as dark as in other vittae species. Two paratypes are in the National Museum from Capetillo, Guatemala, collected by G. C. Champion.

15. *DISONYCHA FUMATA* (LeConte)

PLATE 4, FIGURE 17

Haltica fumata LECONTE, Proc. Acad. Nat. Sci. Philadelphia, vol. 4, p. 86, 1858 (Texas and New Mexico; type in LeConte collection, Mus. Comp. Zool.).

Disonycha alternata var. *fumata* GEMMINGER and HAROLD, Catalogus coleopterorum, p. 3496, 1876.

Disonycha crenicollis HORN, Trans. Amer. Ent. Soc., vol. 16, p. 204, 1889.—JACOBY, Biol. Centr. Amer., vol. 6, pt. 1, p. 316, 1884 (in part). (Not *Altica crenicollis* Say.)

Disonycha alternata JACOBY, Biol. Centr. Amer., vol. 6, pt. 1, p. 311, 1884 (in part).

Disonycha horni JACOBY, Biol. Centr. Amer., vol. 6, suppl., p. 275, 1891 (in part) (Puebla, Mexico; type in British Museum).

Disonycha fumata SCHAEFFER, Journ. New York Ent. Soc., vol. 27, p. 334, 1919.

Description.—Oblong oval, feebly shining, smooth; pale, the labrum, sometimes the frontal tubercles, and the occiput dark; the pronotum always with 2 and often with 5 spots, the elytra with the usual sutural, median, and submarginal vittae, the metasternum usually dark, and in darker specimens apex of femora, the tibiae, and the tarsi dark; antennae long and slender, fully one half length of beetle in male. Head with interocular space half width of head; frontal carina somewhat produced, but not acutely; tubercles not swollen but well marked; surface smooth with coarse punctures on each side about fovea near eye, often bearing hairs; labrum long and always dark, tubercles and occiput frequently dark. Antennae unusually long, dark with paler basal joints, fourth joint nearly twice as long as third; fourth, fifth, sixth, and seventh subequal, the fourth slightly the longest. Prothorax barely twice as broad as long, often less, convex, a slight depression in middle near basal margin; anteriorly with arcuate sides; somewhat shining, under high magnification minutely alutaceous, very indis-

tinctly punctate; pale with the 2 anterior spots the most heavily marked and closely placed, sometimes uniting with each other and the median line; the 2 lateral spots if present paler and large. Scutellum dark. Elytra oblong, convex, humeri well marked, with short intra-humeral sulcus; surface somewhat shining, under high magnification alutaceous, very indistinctly punctate; vittae only moderately wide, the submarginal and sutural usually narrowly united. Body beneath covered with dense pale pubescence; pale, the mesosternum and metasternum dark except in some of the Arizona specimens (*quinquerutata*); in the pale eastern form (*lodingi*) the undersurface often entirely pale; femora in darker specimens with a dark apex, tibiae and tarsi dark. Length, 5.5 to 7 mm; width, 2.8 to 3.8 mm.

Type locality.—Texas (as here restricted).

Distribution.—New York (?); Texas (Anahuac, Brownsville, Cotulla, Del Rio, Sarita, Victoria); Missouri.

Food plant.—*Aster*.

Remarks.—The specimen in the LeConte collection bearing the label *fumata*, which may be regarded as the type, is from Texas, as indicated by the dark red circle label, and is a dark specimen with the frontal tubercles dark, the pronotal spots well marked, the median ones forming a triangle, the mesosternum and metasternum dark and the abdomen and femora brownish. Four others, mounted two to a pin on the long broad points characteristic of Morrison's collection, bear Arizona labels. These are somewhat paler, with the pronotal spots not so close together, and represent var. *quinquerutata* (Schaeffer) described on page 39.

D. fumata is one of the oval species and is readily distinguished from both *caroliniana* and *latifrons* by its longer antennae, its narrower interocular space, its long, dark labrum, and longer, narrower prothorax. It occurs in the southern part of the United States from Alabama and Texas to California, and is also found in Mexico. There is a large series of it not separable by the aedeagus or any other structural character in the National Museum collection with the locality label "N.Y. collection of J. B. Smith", but this label may be incorrect.

There has been considerable confusion concerning the name for this species. Although Horn synonymized *fumata* with *quinquevittata*, from his description and from specimens labeled *crenicollis* in the Horn collection it is evident that he considered *fumata* as the same as *crenicollis*. Mr. Schaeffer (1919) has come to the same conclusion, and has pointed out that *crenicollis* was described by Say from Mexico. Say's description of the indented black pronotal lateral "dot", as well as the black venter, does not fit either *fumata* or *latifrons*, the two species most commonly found labeled *crenicollis*

in collections. I have been unable to identify *D. crenicollis* (Say) in any material examined.

Jacoby confused several species with *fumata*, which he listed in the *Biologia* as a variety of *alternata*, following the Gemminger and Harold Catalogue. But specimens of *fumata* from his collection in the Bowditch collection from North Sonora, Mexico (Morrison) have been labeled *crenicollis*. Later, in the Supplement to the *Biologia*, Jacoby decided that specimens he had previously referred to *crenicollis* represented a new species, to which he gave the name *horni*.

D. horni, in turn, represents another confusion of species. According to K. G. Blair, the specimen bearing the label *D. horni* in the British Museum is from Teapa, which is in the lowlands of south-eastern Mexico. Some of the same original set of specimens from Teapa in the National Museum and also in the Bowditch collection (from Jacoby) are also labeled *D. horni*. Mr. Blair states, on the other hand, that the specimen of *horni* figured in the *Biologia* is from Mexico (Puebla) in the Sallé collection, and is "smaller and shorter", and "to my mind agrees with *fumata* Lec." (as determined by writer) and that "Jacoby's description of *horni* agrees as regards the tibiae rather with the specimen figured than with that to which the label is attached."

Under *horni*, as well as under *crenicollis* in his earlier treatment, Jacoby gives as one of his localities "N. Sonora, Mexico (Morrison)." Specimens in the National Museum taken by Morrison in this locality (which is known now to be Arizona and not Mexico), are identical with *fumata* LeConte and probably represent the same series as that from which LeConte drew up his description, in part. Therefore, it seems best to regard as the type of *D. horni* the specimen figured in the Sallé collection and thus to dispose of the name *horni* as a synonym of *D. fumata* LeConte, and to describe the species from Teapa, Mexico, as new.²⁴

²⁴ *DISONYCHA TEAPENSIS*, new species

PLATE 8, FIGURE 44

Disonycha horni JACOBY, Biol. Centr. Amer., vol. 6, suppl., p. 295, 1891 (in part).

Description.—Elongate oblong (7.5 mm), not shining, yellow, pronotum uneven and with two anterior dark spots; elytra with traces of costae in female, and with dark sutural, median, and submarginal vittae; undersurface with middle of metasternum and area about coxae dark. Head with interocular space about half width of head, smooth in middle with punctures on either side near eye; tubercles distinct, interantennal area somewhat produced but not acutely so; pale with narrow occipital band, somewhat darkened tubercles, and dark labrum. Antennae extending about to middle of elytra, dark with paler basal joints, fourth joint nearly twice as long as third. Prothorax not twice as wide as long, with arcuate sides; disk uneven with lateral callosities; surface alutaceous, indistinctly punctate; pale, with two well-marked anterior dark spots. Scutellum dark. Elytra oblong with parallel sides, humeri pronounced, with a short, deep intra-humeral sulcus; in female traces of costae in apical half of elytra; surface alutaceous,

Mr. Schaeffer has described as *D. quinquerutata* the paler, smaller, southwestern variety that corresponds with the Arizona specimens of *fumata* in the LeConte collection. He has also described as *D. lodingi* a paler form that occurs in Alabama. Neither the small, southwestern arid country form nor the larger Alabama form is separable by any structural differences from the Texas specimens. The aedeagi of all three are indistinguishable. I have, however, retained Mr. Schaeffer's names as varietal names for these color forms. The food plant in the West is *Aster spinosus* as recorded by H. R. Brisley,²⁵ and H. P. Loding has collected it in Alabama on a species of wild aster.

DISONYCHA FUMATA var. QUINQUERUTATA Schaeffer

PLATE 4, FIGURE 19

Disonycha quinquerutata SCHAEFFER, Journ. New York Ent. Soc., vol. 27, p. 336, 1919 (Bill Williams Fork, Ariz.; type, U.S.N.M. No. 42419).

Disonycha carolina BRISLEY, Trans. Amer. Ent. Soc., vol. 51, p. 175, 1925.

Description.—Smaller and paler than typical specimens of *fumata*, with pronotal spots not so closely placed and undersurface paler. Length, 5.7 mm.

Type and one paratype in the United States National Museum.

Type locality.—Bill Williams Fork, Ariz.

Distribution.—Arizona (Bill Williams Fork, Clemenceau, Douglas, Florence, Fort Yuma); New Mexico (Albuquerque); southwestern Utah; California (El Centro, Meloland).

DISONYCHA FUMATA var. LODINGI Schaeffer

PLATE 4, FIGURE 18

Disonycha lodingi SCHAEFFER, Journ. New York Ent. Soc., vol. 27, p. 337, 1919 (Delchamps, Ala.; type, U.S.N.M. No. 42421).

indistinctly punctate; sutural, median, and submarginal dark vittae not so wide as pale intervening vittae, the submarginal and sutural vittae sometimes uniting at apex. Body beneath finely pubescent, pale, the middle of metasternum, area about coxae, and most of the tibiae and tarsi dark. Length, 7.5 to 7.8 mm; width, 4 mm.

Type male and three paratypes, U.S.N.M. No. 43651.

Type locality.—Teapa, Tabasco, Mexico, collected in March by H. H. Smith.

Distribution.—Known only from the type locality.

Remarks.—This species is labeled *D. horni* by Jacoby in the Biologia material in the National Museum, in the Museum of Comparative Zoology, and in the British Museum, and these specimens seem to be paratypes of *D. horni* Jacoby. The typification of Jacoby's name has been discussed above.

D. teapensis belongs to the *alternata* group, having a similar uneven pronotum and traces of elytral costae in the female. It most closely resembles *D. pluriligata* var. *pura*, a Sonoran form. *D. teapensis*, on the other hand, comes from the lowlands of south-eastern Mexico. It is slenderer than *pluriligata*, the head is smoother, and the aedeagus has a broadly pointed tip, which is broader than in any of the other species in that group possessing an acute tip.

²⁵ Brisley, Trans. Amer. Ent. Soc., vol. 51, p. 175, 1925. The specimens on which this record was based, listed by Brisley as "*carolina*", have been examined by the writer and found to be *D. fumata*.

Description.—Paler than typical specimens of *fumata*, the pronotum with only two spots anteriorly, undersurface pale. Easily distinguished from *D. caroliniana* by the dark labrum, and longer antennae. Length, 6 mm.

Type and four paratypes in United States National Museum.

Type locality.—Delchamps, Ala.

Distribution.—Alabama (Delchamps, Baldwin County).

16. *DISONYCHA LATIFRONS* Schaeffer

PLATE 4, FIGURE 20

Disonycha latifrons SCHAEFFER, JOURNAL New York Ent. Soc., vol. 27, p. 336, 1919 (Fort Defiance, Ariz.; type, U.S.N.M. No. 42420).

Description.—Broadly oblong oval, smooth, feebly shining; pale, head with labrum always and occiput behind eyes usually dark, pronotum with 2 roundish spots, often wider than long and usually small and not close together, but in darker specimens all 5 pronotal spots present and the anterior ones sometimes coalescing; elytra with narrow sutural and submarginal vittae united at apex, median vitta wider; body beneath sometimes entirely pale (in eastern variety), but usually with mesosternum except in middle, metasternum, and abdomen, except the last segments, dark; tibiae and tarsi dark. Head with interocular space considerably more than half width of head; interantennal area broad, flat, not produced; frontal tubercles very faintly marked, sometimes not at all defined but continuous with front; smooth, shining, with a group of punctures on each side about fovea; pale, with labrum always dark and occiput behind eyes usually dark. Antennae short, dark, with paler basal joints, third joint considerably shorter than fourth. Prothorax fully twice as wide as long, convex, with only slight median basal depression; somewhat narrowed anteriorly with arcuate sides; surface minutely alutaceous and finely punctate; pale with 2 roundish spots anteriorly, not close together, in darker forms 5 spots present, the anterior ones sometimes coalescing. Scutellum broadly triangular, dark. Elytra broadly oblong, convex; humeri not prominent, with only a trace of intrahumeral sulcus; surface moderately shining, under high magnification finely alutaceous, finely and moderately densely but shallowly punctate; sutural and submarginal vittae narrow and distinctly united at apex; median vitta narrow except in dark forms. Body beneath finely but not conspicuously pubescent; varying greatly in extent of dark coloring; in eastern forms undersurface often nearly pale, with only darker shading on metasternum, in typical western form the mesosternum and metasternum, and usually the abdomen except last ventral segments, entirely dark. Femora always pale, tibiae and tarsi dark. Length, 5.2 to 7.8 mm; width, 2.9 to 4 mm.

Type locality.—Fort Defiance, Ariz. (type female and one paratype in National Museum).

Distribution.—Arizona (Fort Defiance); New Mexico (Albuquerque, Kohler Junction, Torrance County); Nevada (Lincoln County, White Pine County); Utah (Juab County); Colorado (Buttes, Denver, Fort Collins, Golden, Pawnee, Pingree Park); Wyoming (Medicine Bow, Paint Creek, Yellowstone National Park); Montana (Assiniboine, Bozeman, Butte, Crazy Mountains, Dillon, Gallatin Mountains, Musselshell); California (Macdoel); South Dakota (Black Hills, Elmore).

Remarks.—Typical *latifrons* from Arizona, as described by Schaeffer, is pale with a dark labrum and a dark occiput behind the eyes, the pronotum has only 2 transverse spots, the elytral vittae are narrow, and the ventral surface is black except the prosternum, middle of mesosternum, and last 2 ventral segments, which are pale. This color form is common throughout the Rocky Mountains from Arizona to Montana.

DISONYCHA LATIFRONS var. ASTERIS Schaeffer

PLATE 4, FIGURE 21

Disonycha asteris SCHAEFFER, Journ. New York Ent. Soc., vol. 32, p. 141, 1924 (Stonewall, Manitoba; type, U.S.N.M. No. 42427).

Disonycha latifrons var. *asteris* SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 281, 1931.

Description.—Of same size and sculpture as typical *latifrons*, but darker in markings, frontal tubercles marked by a dark line (but this line not any more depressed than in many specimens of typical *latifrons*; prothorax with five large spots, sometimes the two anterior coalescing; elytral vittae wider than in paler form.

Type locality.—Stonewall, Manitoba; collected by J. B. Wallis. Type, U.S.N.M. No. 42427, and three paratypes in National Museum.

Distribution.—British Columbia (Rolla, Swift Current); Alberta (Edmonton, Banff, Leduc, Pincher Creek); Saskatchewan (Moose Jaw); Manitoba (Aweme); Quebec.

Food plant.—Collected on white aster in a swamp (Wallis).

DISONYCHA LATIFRONS var. LATICOLLIS Schaeffer

PLATE 4, FIGURE 22

Disonycha laticollis SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 284, 1931 (Wyandanch, N.Y.; type in collection of Charles Schaeffer).

Disonycha quinquevittata WHITEHEAD, Nova Scotia Ent. Soc. Proc., 1918, p. 38. (Not *Altica quinquevittata* Say.)

Slightly larger than typical western specimens of *latifrons*, and paler, the pronotum usually with only two well-marked small an-

terior spots, and the elytra with narrow vittae. The undersurface sometimes entirely pale or with only the metasternum dark. Length, 7 to 8.2 mm.

Type locality.—Wyandanch, N.Y. (one paratype, U.S.N.M. No. 44117).

Distribution.—Wisconsin (Cranmoor); Minnesota (Mora); Illinois (Chicago); Michigan (Lake Douglas); New York (Wyandanch); New Jersey; Maine (Casco Bay); New Hampshire; Massachusetts (Chicopee, Springfield); Nova Scotia (Truro).

Remarks.—Mr. Schaeffer has sent me a paratype of *laticollis* from Wyandanch, N.Y., which he has donated to the National Museum, and two other specimens from Casco Bay, Maine, both of which belong to the same species.

D. latifrons, like *D. arizonae* and *D. fumata*, has a wide range, and varies in size and degree of coloration in different localities. The Rocky Mountain specimens usually have a more or less darkened undersurface. The Canadian specimens have larger pronotal spots, and the eastern specimens are larger and paler. No sharp line can be drawn between these various races, since their geographic distribution is continuous from Arizona to British Columbia in the Rocky Mountains, and eastward through the provinces of Canada and through the Northern States to Nova Scotia, Maine, and New Jersey. The aedeagus of specimens from Montana does not differ except in size from that of specimens from Massachusetts.

Var. *asteris* was collected by J. B. Wallis on white aster in Alberta. In Nova Scotia W. E. Whitehead²⁶ reared the eastern variety, *laticollis*, from *Solidago squarrosa*, and in Massachusetts George Dimmock collected it on *S. altissima*. Like *D. fumata*, it is evidently a feeder on Compositae.

Like *fumata* and *caroliniana*, *latifrons* is oval and has a distinctly convex prothorax. The western and Canadian varieties are easily distinguished from *fumata* by the dark undersurface. The eastern paler variety has been confused in collections with *caroliniana*. *D. caroliniana* nearly always has a pale labrum, while that of *latifrons* is always dark. Moreover, *latifrons* is generally larger and broader proportionately. The head is unusually smooth and unbroken by swelling of the frontal tubercles or carina. *D. fumata* has a much narrower head with the frontal tubercles and interantennal convexity well marked. The aedeagus of *latifrons* somewhat resembles that of *fumata*, but has a broader tip, and is quite different from the aedeagus of *caroliniana*.

²⁶ Whitehead, Nova Scotia Ent. Soc. Proc., 1918, p. 38. I have examined specimens from which this record was made and found them to be *D. latifrons* var. *laticollis*.

17. DISONYCHA DISCOIDEA (Fabricius)

PLATE 5, FIGURE 23

Galleruca discoidea FABRICIUS, Entomologia systematica, vol. 1, pt. 2, p. 25, 1792 (North America; type lost?).

Chrysomela discoidea FABRICIUS, Systema Eleutheratorum, vol. 1, p. 445, 1801.

Haltica discoidea ILLIGER, Mag. für Insekt., vol. 6, p. 143, 1807.

Disonycha discoidea MELSHEIMER, Catalogue, p. 122, 1853.—CROUCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873.—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 208, 1889.

Disonycha nigridorsis STURM, Catalogue; in Gemminger and Harold, Catalogue coleopterorum, p. 3497, 1876 (as synonym). (Amer. bor.)

Description.—Large (7 mm), broadly oblong oval, feebly shining; pale with large discoidal black spot, somewhat variable in size, but never attaining margin of elytra; tibiae with a darker outer streak, tarsi black; in variety *abbreviata* a dark sutural and a median vitta instead of discoidal spot. Head with interocular space over half width of head; carina broadly rounded, a little produced; frontal tubercles merely indicated; surface smooth and shining, nearly impunctate, with a single large fovea on each side near eye; entirely pale. Antennae short, robust, dark, the basal joints and sometimes the apical ones paler; third joint a little shorter than fourth or fifth, which are subequal. Prothorax about twice as wide as long, somewhat convex, without depressions, narrowed slightly anteriorly with feebly arcuate sides; surface finely alutaceous and finely punctate, entirely pale. Scutellum pale or dark. Elytra broadly oblong oval, somewhat convex; humeri not prominent, with only faint trace of intrahumeral sulcus; surface alutaceous, moderately closely and distinctly punctate; discoidal spot variable in size, always more than half the elytra, never covering margin, usually tapering to apex but not quite reaching it. Body beneath finely pubescent, entirely pale, tibiae with a darker outer edge, tarsi dark. Length, 6.5 to 7.8 mm; width, 3.8 to 4.5 mm.

Type locality.—North America.

Distribution.—Maryland (Plummers Island, Great Falls, Marshall Hall); District of Columbia; Virginia (Nelson County); South Carolina (Charleston); Georgia (Atlanta); Kentucky (Louisville); Tennessee (Knoxville, Blount County); Alabama (Langdale, Chambers County, Sheffield); Louisiana (Baton Rouge); Texas (Dallas, Colorado County); Arkansas (Prairie County); Kansas (Douglas County).

Food plant.—*Passiflora lutea* Linnaeus (H. S. Barber).

Remarks.—This is the only species of *Disonycha* in the United States with a black discoidal spot, evidently formed by the coalescence of vittae, a common phenomenon in some other genera of Chry-

somelidae, such as *Trirhabda*. A closely related species with similar discoidal marking, *D. marginipennis* Suffrian, occurs in the West Indies, and in Mexico are two species, *D. subaenea* Jacoby and *D. sallaei* Jacoby, resembling *discoidea* in color pattern. All three are easily separable by other characters. *D. dorsata* Jacoby, also from Mexico and Central America, in its paler form has a discoidal spot, but it is not at all closely related to *discoidea*, but rather to *glabrata*.

DISONYCHA DISCOIDEA var. ABBREVIATA Melsheimer

PLATE 5, FIGURE 24

Disonycha abbreviata MELSHEIMER Proc. Acad. Nat. Sci. Philadelphia, vol. 3, p. 163, 1847 (Pennsylvania; type in Melsheimer collection, Mus. Comp. Zool.).—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 207, 1889.

Disonycha abbrevita (sic) CROTCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873.

Disonycha discoidea var. *abbreviata* SCHAEFFER, Journ. New York Ent. Soc., vol. 27, p. 33, 1919.

Description.—Of same size, sculpture, and coloring as *discoidea*, but with a sutural and a median vitta on each elytron instead of a black, discoidal spot, these vittae not reaching apex.

Type locality.—Pennsylvania.

Distribution.—District of Columbia; Maryland (Cabin John, Plummers Island); Virginia (Nelson County, Falls Church); Kentucky ("near Cincinnati, Ohio"); Kansas (Topeka); Illinois (Bloomington); Indiana (Edwardsville).

Remarks.—Schaeffer, having examined specimens showing an intergradation in color, has suggested that *abbreviata* and *discoidea* may be color varieties of the same species, and this suspicion apparently is confirmed by examination of the aedeagi, which are indistinguishable. I have not seen any specimens showing an intergradation in color.

18. DISONYCHA LEPTOLINEATA Blatchley

PLATE 5, FIGURES 25, 26

Disonycha abbreviata var. *leptolineata* BLATCHLEY, Can. Ent., vol. 40, p. 143, 1917 (Dunedin, Fla.; cotype, U.S.N.M. No. 21514).

Description.—Oblong oval, somewhat shining, smooth; pale with dark sutural and median elytral vittae, the sutural one extending nearly to the apex; metasternum in dark specimens usually more or less darkened, undersurface in typical *leptolineata* entirely pale; outside edge of tibiae and tarsi dark. Head with interocular space more than half width of head, carina broadly rounded and somewhat produced, frontal tubercles not prominent; surface smooth, shining, often impunctate or nearly so, with a single large fovea on each side near eye; entirely pale, tip of mandibles sometimes darkened. Anten-

nae short, dark, basal joints paler, third joint a little shorter than fourth or fifth, which are subequal, the fourth slightly longer. Prothorax not twice as broad as long, somewhat convex, narrowed anteriorly with slightly arcuate sides; finely alutaceous and minutely punctate, entirely pale. Scutellum pale or dark. Elytra oblong oval, a little convex, humeri not prominent and only slight trace of intrahumeral sulcus; surface alutaceous, finely punctate, a sutural and a median vitta on each elytron, the sutural one almost reaching apex, in Florida specimens the vittae very narrow. Body beneath finely pubescent, sometimes entirely pale, often with metasternum in part or whole darkened; outer edge of tibiae usually dark, and tarsi dark. Length, 6.2 to 7.5 mm; width, 3.4 to 4.5 mm.

Type locality.—Near Dunedin, Fla.

Distribution.—Florida (Dunedin, Biscayne, Capron, Fort Myers, Lake Ashby, Lake Worth, Orange County).

Food plant.—Unknown.

Remarks.—The species belonging to the *discoidea* group are very closely related structurally, although there is considerable variation in size and coloring. *D. leptolineata* was described by Blatchley from pale specimens from Florida in which the vittae are extremely narrow. Schaeffer described *texana* from Texas from small, dark specimens. Both Schaeffer and Blatchley distinguished their species from *abbreviata* by color and finer punctation. Aside from the difference in degree of dark coloring, *texana* is not readily separable from *leptolineata*, and in this paper is treated as a color variety.

DISONYCHA LEPTOLINEATA var. TEXANA Schaeffer

PLATE 5, FIGURE 27

Disonycha texana SCHAEFFER, Journ. New York Ent. Soc., vol. 27, p. 339, 1919 (Brownsville, Tex.; type, U.S.N.M. No. 42422).

Description.—Elytra with median and sutural vittae wider than in typical *leptolineata*. Aedeagus with lower lip slightly broader and less acutely narrowed. Length, 6 to 7.5 mm; width, 3.5 to 4.5 mm.

Type locality.—Brownsville, Tex.; type and one paratype in National Museum.

Distribution.—Virginia (Norfolk, Lake Drummond); North Carolina (Washington); South Carolina (Swansea); Louisiana (Tallulah); Texas (Alice, Beeville, Brownsville, Calvert, College Station, Corpus Christi, Cotulla, Dallas, Denton, Handley, Lexington, Mesquite, Mission, Plano, Rosser, Sinton, Wolfe City, Victoria); Kansas (Douglas County); Arizona (Cochise County); Mexico.

This variety is not confined to Texas but extends southward into Mexico and westward to Arizona. There are also specimens from Virginia that are larger and with more pronounced punctation, but not so distinct as in *discoidea*.

Several characters seem to indicate that *leptolineata* is specifically distinct from *discoidea*: (1) The punctation is never so heavy as in *discoidea*; (2) the aedeagus has a little more slender tip; and (3) no form of *leptolineata* is yet known in which the elytral vittae coalesce to form a discoidal spot.

19. *DISONYCHA ANTENNATA* Jacoby

PLATE 5, FIGURE 28

Disonycha antennata JACOBY, Biol. Centr. Amer., vol. 6, pt. 1, p. 35, 1884 (Mexico; type not designated).

Disonycha albida BLATCHLEY, Can. Ent., vol. 56, p. 169, 1924 (Big Pine Key, Fla.; type in collection of W. T. Davis).

Description.—Broadly oblong oval, smooth, somewhat shining, entirely pale except for dark antennae, dark streak on outside of tibiae, and dark tarsi. Head with interocular space more than half width of head; carina broadly rounded, slightly produced, tubercles not prominent, smooth and shining, usually impunctate or nearly so with a large fovea on each side near eye; pale, except sometimes a darkened tip to mandibles. Antennae short, robust, dark with paler basal joints, third point shorter than fourth or fifth, which are subequal with the fourth slightly longer. Prothorax about twice as wide as long, somewhat convex, narrowed a little anteriorly with slightly arcuate sides; finely alutaceous, very indistinctly punctate, entirely pale. Scutellum pale. Elytra broadly oblong oval, somewhat convex, humeri not prominent, with a short intrahumeral sulcus; surface somewhat shining, under high magnification finely alutaceous, very finely punctate, entirely pale. Body beneath sparsely and inconspicuously pubescent, entirely pale; tibiae with a dark outer streak, or only apex darkened, tarsi dark. Length, 6.5 to 7.6 mm; width, 3.6 to 4.2 mm.

Type locality.—Type not designated but the following localities given: Mexico (Ventanas, Cordova, Vera Cruz, Panistlahuaca, Jalapa).

Distribution.—Florida (Big Pine Key); Mexico.

Food plant.—Unknown.

Remarks.—Only two specimens of this pale species taken in the United States are known to me, one, the type of *D. albida*, in the collection of W. T. Davis, and the other in the National Museum, taken by H. S. Barber, both collected on Big Pine Key. It is a Mexican species which may have taken foothold at the tip of Flor-

ida on Big Pine Key, but which cannot yet be very abundant there. It belongs to the *discoidea* group, being very closely related structurally. The aedeagus is very much like that of *discoidea* and *leptolineata*. No other species of *Disonycha* in the United States is so pale as this. *D. figurata*, another pale Mexican species that has crept into the United States only in Arizona and Nevada, has two dark pronotal spots and indistinct elytral vittae.

20. DISONYCHA ALABAMAE Schaeffer

PLATE 6, FIGURE 29

Disonycha alabamae SCHAEFFER, JOURN. New York Ent. Soc., vol. 27, p. 337, 1919 (Citronella, Ala.; type in collection of Charles Schaeffer).

Description.—Small (5 mm), oblong oval, feebly shining, pale with dark labrum, tibiae, tarsi, and elytral vittae; the wide median vitta on each elytron considerably nearer to the submarginal vitta than to the sutural. Head with interocular space more than half width of head; tubercles somewhat swollen, carina broadly rounded and slightly produced; occiput smooth in middle with punctures on each side and the usual fovea near eye; pale with dark labrum. Antennae dark with paler basal joints, third, fourth, and fifth joints subequal, the fourth slightly the longest. Prothorax over twice as broad as long, somewhat convex, narrowed anteriorly with sides arcuate; not shining, distinctly alutaceous, with fine, rather dense punctation; entirely pale. Scutellum black, more rounded than in *admirabilis*. Elytra oval, not very convex, with humeri not at all prominent; surface alutaceous, finely and shallowly but distinctly punctate; sutural and submarginal vittae not united, the median one wide and placed closer to the submarginal vitta than to the sutural, the intervening pale space between it and the submarginal vitta being very narrow. Body beneath indistinctly and rather sparsely pubescent; entirely pale, the apex of tibiae and tarsi dark. Length, 5 mm; width, 2.5 mm.

Type locality.—Citronella, Ala., collected by H. P. Loding.

Distribution.—Alabama (Citronella); Texas (Columbus).

Food plant.—Unknown.

Remarks.—Although I have not dissected a male of this species, I am convinced that it is distinct from both *admirabilis* and *arizonae*, the two species that it resembles most closely. It differs from *admirabilis* in having antennal joints 3, 4, and 5 subequal (in *admirabilis* the third joint is decidedly shorter than the fourth), in having the prothorax more distinctly alutaceous and punctate, and in having the undersurface sparsely and indistinctly pubescent. It is distinguished from *arizonae* by its more oval shape, by having longer antennae, and by having the frontal tubercles more pronounced. It

differs from both in the more lateral position of the median vitta, which is its most striking characteristic.

I have seen only two specimens of this species, one, a male, from the collection of H. P. Loding, and the other, a specimen identified by Schaeffer in the LeConte collection from Columbus, Tex., probably collected by E. A. Schwarz.

21. *DISONYCHA ADMIRABILIS* Blatchley

PLATE 6, FIGURE 30

Disonycha admirabila BLATCHLEY, Journ. New York Ent. Soc., vol. 32, p. 90, 1924 (Knox County, Ind.; type in collection of W. S. Blatchley).

Description.—Small (about 5 mm), oval, somewhat shining, pale; pronotum usually unspotted, sometimes with two anterior spots, elytra with sutural, median, and submarginal vittae, the sutural and submarginal rarely joining at apex; undersurface pale with tibiae and tarsi darker. Head with interocular space more than half width of head; carina not acute, broad and slightly produced, tubercles somewhat swollen, occiput smooth and shining; punctures about fovea on each side near eye; pale, with tubercles sometimes and labrum always dark. Antennae dark with paler basal joints, third joint distinctly shorter than fourth or fifth, which are subequal. Prothorax approximately twice as wide as long, convex, narrowed somewhat anteriorly with arcuate sides; under high magnification very finely alutaceous and indistinctly, sparsely punctate; shining, pale, usually without spots, sometimes with 2 anterior ones, rarely 4. Scutellum dark. Elytra oval, somewhat convex, humeri not prominent, with a short intrahumeral sulcus; finely alutaceous, finely and shallowly punctate; pale, with sutural, median, and submarginal vittae, the submarginal and sutural vittae rarely united at apex. Body beneath finely and densely pubescent, entirely pale; tibiae and tarsi brownish. Length, 4.8 to 5.8 mm; width, 2.6 to 3.2 mm.

Type locality.—Knox County, Ind.; type, male, collected by W. S. Blatchley, and in his collection.

Distribution.—Massachusetts (Chicopee); New York (Long Island, West Point); New Jersey (Dundee Lake); District of Columbia; Maryland (Cabin John, Chesapeake Bay, Plum Point, Glen Echo); Virginia (Clarendon, Virginia Beach); Louisiana (Baton Rouge, Covington, Opelousas, Tallulah); Texas (College Station, Columbus, Cypress Mills, Edna, Gainesville, Galveston, Lexington, San Diego, Victoria); Kansas (Douglas County).

Food plants.—*Cassia* sp. (J. D. Mitchell); wild legume (Norman Allen); *Polygonum* sp. (W. S. Blatchley).

Remarks.—This is one of the smallest of the pale vittate species, and is characterized by its oval shape, shining, very indistinctly

punctate surface, and pale coloring. The pronotal spots are usually entirely lacking. It is possibly the species illustrated in Olivier's *Entomologie* under *caroliniana*, and is therefore confused in some collections with *caroliniana*, a somewhat larger species.

Mr. Blatchley has kindly sent me the type of this species for examination. His specimen has preserved the fresh coloring of the live beetle very well, and the red and silvery colors of the elytra are still apparent, although in the majority of the dried specimens this coloring has faded to uniform pale yellow or brownish yellow. In his description the head is said to be impunctate, and this is true for his specimen except for the fovea, which consists of a circle of coarse punctures united to form a depression on each side of the head near the eye. Other specimens, however, frequently have scattered punctures on each side of the head, and the frontal tubercles are often darker brown than the rest of the head.

22. DISONYCHA GLABRATA (Fabricius)

PLATE 6, FIGURE 32

Crioceris tomentosa FABRICIUS, *Systema entomologiae*, p. 122, 1775 (not *Chrysomela tomentosa* Linnaeus, 1758).

Crioceris glabrata FABRICIUS, *Species insectorum*, vol. 1, p. 156, 1781 (In Africa aequinoctiali).

Chrysomela glabrata FABRICIUS, *Mantissa insectorum*, vol. 1, p. 76, 1787.

Altica vittata OLIVIER, *Encyclopédie méthodique*, vol. 4 (vol. 1, Insects), p. 105. 1789.

Galleruca glabrata FABRICIUS, *Entomologia systematica*, vol. 1, pt. 2, p. 25, 1792; *Syst. Eleuth.*, vol. 1, p. 494, 1801.

Altica glabrata OLIVIER, *Entomologie*, vol. 6, p. 685, 1808.

Altica alternata LATREILLE, in *Voy. Humboldt, Zool.*, vol. 2, p. 39, 1833 (not *Haltica alternata* Illiger).

Disonycha glabrata CHEVROLAT, in *Dejean Catalogue*, p. 414, 1837.—CROUCH, *Proc. Acad. Nat. Sci. Philadelphia*, vol. 25, p. 64, 1873.—HAROLD, *Coleopterologische Hefte*, vol. 15, p. 4, 1876.—JACOBY, *Biol. Centr. Amer.*, vol. 6, pt. 1, p. 311, 1884.—HORN, *Trans. Amer. Ent. Soc.*, vol. 16, p. 207, 1889.

Disonycha horticola CHEVROLAT, in *Dejean Catalogue*, p. 414, 1837 (Mexico).

Disonycha albicollis STURM, *Catalogue*, p. 283, 1843 (Amer. bor.).

Description.—Elongate oblong oval, polished, pale yellow with darkened occiput, median pronotal spot, this sometimes lacking or occasionally three pronotal spots, and broad black sutural, median, and marginal elytral vittae; undersurface pale, sometimes darkened in middle of metasternum and abdomen. Head with interocular space about half width of head; smooth with a few punctures about fovea on each side near eye; frontal tubercles well marked, carina narrowly produced; pale with occiput and sometimes tubercles and labrum dark. Antennae dark with pale basal joints, third joint much shorter than fourth and fifth, which are subequal, the fourth the longer. Prothorax approximately twice as broad as long, con-

vex, somewhat narrowed anteriorly, with arcuate sides, shining, very faintly punctate, pale with a median dark diamond-shaped spot, sometimes two smaller lateral spots, or occasionally immaculate. Scutellum black. Elytra convex with the humeri marked by a short intrahumeral sulcus; sides parallel; surface shining, shallowly punctate, in some specimens (from Arizona and Texas) punctation very indistinct; pale with broad sutural, median, and usually marginal vittae (in Arizona specimens the margin is not darkened and there is only a narrow submarginal vitta); sutural and marginal vittae uniting at apex. Body beneath finely pubescent, variably colored, sometimes entirely pale with only apex of tibiae and tarsi dark, sometimes the metasternum, middle of abdomen, apex of femora, the tibiae, and the tarsi dark; epipleura, except in pale Arizona specimens, dark. Length, 5.3 to 6.3 mm; width, 3 to 3.5 mm.

Type locality.—"In Africa *aequinoctiali*" (see discussion later).

Distribution.—New York; Pennsylvania (Allegheny); Maryland (Bladensburg, Cabin John, College Park, Plummers Island); District of Columbia; Virginia (Falls Church, Fredericksburg, Nelson County, Norfolk); North Carolina (Southern Pines); South Carolina (Dalzell); Georgia (Thomasville); Florida (Dade City, Enterprise); Alabama (Mobile); Louisiana (Baton Rouge, Delchamps, Tallulah); Kentucky (Wickliffe); Tennessee (Elmwood); Texas (Brownsville, Columbus, Cypress Mills, Dallas, Gainesville, Greenville, Handley, Harlingen, Mineola, New Braunfels, Plano, Rosser, Santa Maria, Waco); Missouri; Illinois (Alto Paso, Billets Station, Dubois, Elizabethtown, Fountain, Bluff, Herod, Metropolis, Prairie du Rocher, Pulaski, Urbana); Indiana (Vermillion County); Ohio; Colorado; Arizona (Cochise County, Douglas, Gila Valley, Globe, Graham County, Huachuca Mountains, Nogales, Oracle, Palmerly, Santa Rita Mountains, Tucson); New Mexico (Las Vegas); West Indies, Mexico, Central America to South America.

Food plants.—"Habitat in Jamaica Myrto Pimenta. Dr. Schwarz" (Fabricius, 1801); *Amaranthus retroflexus* Linnaeus (Garman, Chittenden); oak, bull thistle (Blatchley).

Remarks.—Fabricius (1775) originally applied the Linnaean name *tomentosa* to a species that he described in contradiction to Linnaeus' "elytris subtomentosis" as having the "elytra in rostro glabra, nitida." He gave the locality in this first description as "America." In 1781, repeating his shorter diagnostic description of this species, he gave it the name *glabrata* and quoted the Linnaean description of *tomentosa* with a question. The locality this time was given as "in Africa aequinoctiali" (not, as Harold stated, "America aequinoctiali"). In 1787, Fabricius again published the same short description of *glabrata*, without mentioning Linnaeus'

tomentosa and without locality. In 1792 the original long description under the name *glabrata* was repeated, with the locality this time given as Jamaica, and in his treatment of *glabrata* in 1801 Fabricius again gave the locality as Jamaica. From the original description (1775) it is plain that Fabricius had before him something quite different from Linnaeus' *Chrysomela tomentosa*, which is probably some species of *Galerucella*.²⁷ The original description of *glabrata* applies in every way to the *Disonycha* to which the name *glabrata* is now given.

This species is widely distributed. It is found throughout Mexico, Central America, and into South America, and in the West Indies. In the United States it occurs as far north as New York and Illinois and west to Arizona. The Arizonan and sometimes the Mexican specimens are paler. In them there is only a spot on the occiput, the pronotum is sometimes immaculate, the usually distinctive black marginal vitta does not cover the margin, the other vittae are often narrower, and the undersurface and epipleura are pale. The elytral punctation of the southern specimens is also not as deep. Otherwise, in its wide range, the species presents little variation. *D. glabrata* is not closely related to any other North American species but is allied to two Mexican and Central American species, *D. dorsata* Jacoby and *D. nigrita* Jacoby.²⁸

One of the specimens of the Biologia material in the National Museum labeled *glabrata* is *D. arizonae* Casey, indicating that Jacoby may have confused that species with *glabrata* in his treatment of *Disonycha* of Mexico and Central America.

23. DISONYCHA MARITIMA Mannerheim

PLATE 6, FIGURE 31

Disonycha maritima MANNERHEIM, Bull. Soc. Imp. Moscou, vol. 16, p. 311, 1843 (California).—CROTCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873.—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 206, 1889.

Description.—Small (4 to 5 mm), broadly oblong oval, somewhat shining, densely punctate, pale with dark labrum and occipital spot extending down front, and sutural, median, and marginal vittae covering most of the elytra; undersurface dark except prosternum and last ventral segments. Head with interocular space a little over half width of head; frontal carina narrow, slightly produced; occiput and front as far as tubercles usually densely and coarsely punctate, sometimes with a smooth median area; pale with black occipital spot extending down front and a darkened labrum. Antennae dark

²⁷ Blake, Revision of the species of beetles of the genus *Tetrhabda* north of Mexico. Proc. U.S.Nat.Mus., vol. 79, art. 2, p. 13, 1931.

²⁸ Blake, Bull. Brooklyn Ent. Soc., vol. 26, p. 76, 1931.

with paler basal joint, third, fourth, and fifth joints subequal, the fourth slightly the longest. Prothorax approximately twice as wide as long, somewhat convex, narrowed anteriorly with arcuate sides; alutaceous, densely and moderately coarsely punctate, except sometimes a smooth median linear area; entirely pale. Scutellum dark. Elytra broadly oblong oval, convex, humeri not marked and with little trace of intrahumeral sulcus, moderately coarsely and densely punctate and somewhat shining; pale with wide sutural, median, and marginal vittae, the sutural and marginal vittae uniting at apex. Body beneath sparsely and indistinctly pubescent, shining black except prosternum and last ventral segment; legs black with a light streak on outside of tibiae. Length, 4 to 5 mm; width, 2.3 to 3.3 mm.

Type locality.—California, near shore. Collected by Eschscholtz and Blaschke.

Distribution.—California (Birds Landing, Carmel, Colton, Figueroa Park, Los Angeles, San Mateo, San Francisco, Warners, Yosemite National Park); Nevada (Ormsby County).

Food plant.—Sugar beet (*Beta vulgaris* var.).

Remarks.—*D. maritima*, like *glabrata*, has a dark marginal vitta on the elytra, but differs from *glabrata* in being coarsely and densely punctate and in having dark legs and a darker ventral surface. Like *glabrata*, it is not closely related to any other North American species, and appears more closely allied to the species with dark elytra than to the vittate species.

Dr. E. C. Van Dyke²⁹ has noted that this insect sometimes hibernates in colonies. He collected it in the clefts of rocks along the crest of San Bruno Hills, on the southern boundary of San Francisco County. I have collected it in July at an altitude of 8,000 feet at Glacier Point, Yosemite National Park.

24. DISONYCHA COLLATA (Fabricius)

PLATE 7, FIGURE 41

Crioceris collata FABRICIUS, Systema Eleutheratorum, vol. 1, p. 463, 1801 (Carolina; Bosc collection).

Altica collata OLIVIER, Entomologie, vol. 6, p. 702, 1808.

Disonycha collata DEJEAN, Catalogue, p. 414, 1837.—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 212, 1889 (in part).

?*Disonycha collaris* CROTCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873.

Disonycha mellicollis HORN, Trans. Amer. Ent. Soc., vol. 16, p. 211, 1889 (not *Altica mellicollis* Say).

Description.—Elliptic oval, with shining metallic green or blue elytra, dark upper half of head, and partially darkened undersurface; lower front of head, prothorax, femora, and margin of abdomen

²⁹ Van Dyle, Ent. News, vol. 30, p. 244, 1919.

pale. Head with interocular space scarcely half width of head; interantennal area carinate but not much produced, tubercles indistinctly marked, a few coarse punctures scattered about fovea on each side near eye, often in a row, producing a furrow between the eye and frontal tubercles, but leaving middle of front and occiput smooth; antennal sockets and lower front about carina pale, labrum dark, usually the tubercles and always the area about eyes and upper part of head dark with a metallic luster. Antennae dark brown, the three basal joints paler, third, fourth, and fifth joints subequal, the fourth slightly the longest. Prothorax approximately twice as wide as long, nearly rectangular with sides slightly bowed, somewhat convex, without depressions, minutely alutaceous and very indistinctly punctured, entirely pale. Scutellum black. Elytra shining lustrous green or blue, somewhat convex, with humeri only faintly marked, smooth, minutely alutaceous, and finely, not closely punctate. Body beneath with fine, pale pubescence, femora and margin of abdomen pale, mesosternum and metasternum and middle of abdomen dark brown, often with a metallic luster, tibiae and tarsi more or less darkened. Length, 4 to 5.5 mm: width, 2.2 to 3 mm.

Type locality.—"Carolina." Collected by Bosc.

Distribution.—Maine (Portland); Massachusetts (Lynn); Rhode Island (Providence); New York (Fort Hamilton, Long Island); New Jersey (Clementon); Pennsylvania (Philadelphia); Maryland (Bladensburg); District of Columbia; North Carolina (Southern Pines); Florida (Boynton, Capron, Jacksonville, Jupiter, Miami, Point Garda, St. Lucie, Sand Point, North Smyrna); Alabama (Mobile); Mississippi (Gulfport); Louisiana (Bonfouca, Merryville, New Orleans, Tallulah); Texas (Alice, Brownsville, College Station, Corpus Christi, Columbia, Cypress Mills, Corsicana, Dallas, Harlingen, Kerrville, Kingsville, Mercedes, Pierce, Rosson, Wichita Falls, Victoria); Arkansas; Kansas (Douglas County, Onaga, Topeka); Missouri (St. Louis); Ohio (Columbus); Indiana (Turkey Run); Illinois (Anna, Dubois, Centralia, Havana, Prairie du Rocher, Pulaski, Quincy, St. Joseph, Urbana); Mexico and Central America.

Food plants.—*Portulaca*, *Amaranthus*, spinach, beet, chickweed, lettuce.

Remarks.—Although the original Fabrician description of *collata* is short, the essential color characters, the bicolored head, the pale prothorax, pale femora and margin to the abdomen, and smooth, shining green elytra sufficiently differentiate it from other closely allied species. It is found most frequently in collections under the name *D. mellicollis* (Say). Horn attempted to distinguish *collata* and *mellicollis* by size and punctation. Say's description of *melli-*

collis does not fit any species of *Disonycha* known to me either from North America or Central America. It differs from *collata* in that the head is "blue black" with "immaculate face," and the venter is blackish with the last segment dull yellow. It differs from *triangularis*, *wanthomelas*, and *politula* in that the "thighs are honey-yellow."

Disonycha collata is somewhat variable in both size and punctuation. The Florida and Kansas specimens are usually much smaller and green, and with very fine punctuation, while the Texas and northern specimens are larger, bluish in color, and with distinct punctuation. There is no difference in the aedeagi, however. The species ranges from Portland, Maine, west to Kansas and Missouri, and south into Mexico and Central America.

25. *DISONYCHA SEMICARBONATA* LeConte

PLATE 6, FIGURE 33

Disonycha semicarbonata LECONTE, Smithsonian Contr. Knowl., vol. 11, p. 25, 1859 (Santa Fe, N.Mex.; type in LeConte collection, Mus. Comp. Zool.).

Disonycha mellicollis HORN, Trans. Amer. Ent. Soc., vol. 16, p. 210, 1889 (in part).

Description.—Oblong oval, feebly shining, black; front, prothorax, last ventral segment, and femora pale. Head with interocular space slightly more than half width of head; frontal carina narrowly produced; punctuation coarse and rather dense over occiput and down front to tubercles; head dark except for frontal tubercles and about base of antennae and upper portion of carina. Antennae dark with paler basal joints, third, fourth, and fifth joints subequal, the fourth slightly the longest. Prothorax about twice as wide as long, almost rectangular with sides nearly straight, somewhat convex; alutaceous and finely, rather densely punctate, entirely pale. Scutellum dark. Elytra oblong oval, convex, with humeri not marked and with little trace of intrahumeral sulcus; distinctly alutaceous, closely and moderately coarsely punctate; entirely black and not very shining. Body beneath finely pubescent, dark, the prosternum, last ventral segment, and femora pale. Length, 5 mm; width, 2.8 mm.

Type locality.—Santa Fe, N.Mex.; one specimen (female) collected by Fendler.

Distribution.—New Mexico (Santa Fe, Magdalena Mountains); Colorado (Boulder).

Food plant.—Unknown.

Remarks.—Although this species has been synonymized with *mellicollis* (see discussion under *collata* on p. 53) by Horn, it is quite different, having a bicolored head and distinctly punctate pronotum. It differs from *collata* in that while the femora are pale

the ventral surface except the last segment is dark. It is also much more coarsely punctate than *collata*, both on the head, pronotum, and elytra, and, as LeConte remarked, it is broader and less oval than *collata* or *xanthomelas*. *D. collata* apparently does not occur west of the Great Plains, and specimens of *semicarbonata* have been examined only from Colorado and New Mexico. It differs from *xanthomelas* and *triangularis* in having a bicolored head, and from *politula* not only in its coloring but also in its punctation. The aedeagus is unlike that of any of the dark colored species.

This is another species that is rare in collections. I have seen only the LeConte type, a specimen in the Snow collection from Magdalena Mountains, N.Mex., and one in the Casey collection from Boulder, Colo.

26. DISONYCHA XANTHOMELAS (Dalman)

PLATE 7, FIGURE 38

Haltica collaris ILLIGER, Mag. für Insekt., vol. 6, p. 126, 1807 (not *Galleruca collaris* Fabricius, 1798).

Haltica xanthomelas DALMAN, Analecta entomologica, p. 79, 1823 (New York).

Disonycha xanthomelaena GEMMINGER and HAROLD, Catalogus coleopterorum, p. 3497, 1876.—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 209, 1889.

Disonycha meridivora MELSHEIMER, Catalogue, p. 122, 1853.—GEMMINGER and HAROLD, Catalogus coleopterorum, p. 3497, 1876 (Pennsylvania) (as synonym).

Description.—Elongate oval, feebly shining, the head, elytra, mesosternum and metasternum, and legs, except at base, black, the elytra often with aeneous or bluish luster; the prothorax, abdomen in part, and base of legs pale. Head with interocular space about half width of head; carina narrowly produced; a furrow of punctures on each side of head extending from fovea near eye down to antennal socket, leaving occiput and front usually smooth and impunctate, sometimes a few coarse, scattered punctures across front, head entirely dark and polished. Antennae dark with basal joints somewhat paler, third joint shorter than fourth or fifth, which are subequal, the fourth slightly longer. Prothorax approximately twice as wide as long, somewhat convex, without depressions, nearly rectangular with sides slightly arcuate; surface minutely alutaceous and very finely punctate, entirely pale. Scutellum black. Elytra black, feebly shining, with aeneous or bluish luster; oblong, convex, humeral prominences not marked; surface distinctly alutaceous, punctation fine, not dense. Body beneath pale with black shining mesosternum, metasternum, and legs; the trochanters, base of femora, and often posterior angle of metasternum more or less pale; abdomen pale, sometimes brown in middle; pubescence fine but indistinct. Length, 4.5 to 5.8 mm; width, 2.2 to 3.4 mm.

Type locality.—New York.

Distribution.—Northwest Territories; Quebec (St. Johns); Saskatchewan (Oxbow); Alberta (Blackfalds); Manitoba (Aweme); Massachusetts (Cambridge, Fall River, Fitchburg, Framingham, Nantucket, Sherborn, Springfield); Connecticut (Hartford); New York (Long Island, Potsdam); Pennsylvania (Germantown, Harrisburg, Philadelphia); Maryland (Plummers Island); District of Columbia; Virginia (Jonesville, Nelson County); Louisiana (New Orleans); Texas (Columbus, Cypress Mills, Dallas, Greenville, Mesquite, Plano, Victoria); Kansas (Cherokee, Douglas County, Kansas City, Lawrence, Topeka, Riley County); Nebraska (Malcolm); Iowa (Iowa City, Lake Okoboji, Muscatine, Solon); Wisconsin (Beaver Dam, Madison); Indiana (Franklin, Knox); Michigan (Detroit); Illinois (Algonquin, Bloomington, Centralia, Chicago, Dongola, Grand Tower, Homer, La Grange, Mahomet, Muncie, Oakwood, Peoria, Quincy, Riverside, St. Joseph, Springfield, Thompson Lake, Urbana); Ohio (Columbus).

Food plants.—Chickweed (*Stellaria media*), *Chenopodium album*, *Amaranthus spinosus*, spinach, beet (Chittenden).

Remarks.—This species, a well-known garden insect, is distinguished from *D. triangularis*, found on similar food plants, by its lack of pronotal spots and paler abdomen. Both species have dark heads and legs, but in *xanthomelas* the base of the femora is pale, and often the posterior femora have a pattern similar to that of *politula*, in which the pale basal half is diagonally marked off from the apical dark half. Some specimens from Canada are much smaller, but no structural differences are apparent and the aedeagi are like those of the larger ones.

DISONYCHA XANTHOMELAS var. CERVICALIS LeConte

Disonycha cervicalis LeConte, Smithsonian Contr. Knowl., vol. 11, p. 25, 1859
(Kansas and Georgia; type in LeConte collection, Mus. Comp. Zool.).

Description.—Head shining, dark brown (not black), a furrow of punctures as in typical *xanthomelas* on each side of front, and a few scattered punctures across front; antennae with third, fourth, and fifth joints subequal, basal joints and last apical one paler. Prothorax as in *xanthomelas*. Elytra oblong oval with humeri not marked and with only a slight trace of intrahumeral sulcus; sculpture and coloring similar to typical *xanthomelas*. Body beneath entirely pale; legs except at base dark, the posterior femora with a paler streak on the inside.

Type locality.—Kansas (as here restricted).

Distribution.—Kansas; Georgia.

Remarks.—There is only one specimen of this in the LeConte collection, a female bearing a green label, indicating that it is the Kansas specimen mentioned by LeConte. The other specimen re-

ferred to by LeConte is evidently one in Horn's collection labeled "Ga.", and is the only other specimen I have examined. I have not dissected any specimen of *cervicalis*, but cannot distinguish it from specimens of *xanthomelas* except by the paler coloring of the undersurface. There is considerable variation in size and coloring of the undersurface in the latter species.

DISONYCHA XANTHOMELAS ATRELLA, new variety

PLATE 7, FIGURE 39

Description.—Small (4 mm), entirely dark except the prothorax and last 1 or 2 ventral segments. Head shining black, frontal tubercles often not at all marked and continuous with the carina; carina narrowly produced; a furrow of punctures extending from fovea on each side near eye toward antennal socket, sometimes scattered coarse punctures across front, head otherwise polished and dark. Prothorax as in typical *xanthomelas*. Elytra oblong oval, shining black without aeneous luster, the punctation usually finer than in typical *xanthomelas*. Body beneath finely and indistinctly pubescent, entirely dark except prosternum and last ventral segment and margin of penultimate segment, sometimes base of legs slightly paler. Length, 4.2 to 4.8 mm; width, 2.2 to 2.8 mm.

Type male and 4 paratypes (1 female, three male). The type and two paratypes in Museum of Comparative Zoology, Cambridge, Mass., Blanchard collection. Two paratypes (male), U.S.N.M. No. 43652.

Type locality.—Tyngsboro, Mass., collected by F. Blanchard.

Distribution.—Massachusetts (Tyngsboro); Virginia (Fort Monroe, Hubbard and Schwarz collection); Alabama (Mount Vernon, H. P. Loding collector).

Remarks.—At first glance this small dark variety of *xanthomelas* appears like a distinct species. The head in some specimens has the frontal tubercles undivided by any line or depression from the carina, giving it a most unusual appearance. The aedeagus, however, so closely resembles that of *xanthomelas* that it is doubtful whether it can be more than varietally distinct.

27. DISONYCHA TRIANGULARIS (Say)

PLATE 7, FIGURE 36

Altica triangularis SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 4, pt. 1, p. 84, 1824 (Missouri; type lost).

Haltica puncticollis KIRBY, Fauna Boreali Amer., vol. 4, p. 218, 1837 (Canada, "Lat. 65°").

Disonycha triangularis MELSHEIMER, Catalogue, p. 122, 1853.—CROUCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873.—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 209, 1889.

Description.—Broadly oblong oval; head, elytra, mesosternum, metasternum, abdomen, and legs black, feebly shining, elytra sometimes with bluish, purplish, or aeneous luster; prothorax pale with three triangularly placed median black spots. Head with interocular space considerably more than half width of head; carina narrowly produced; occiput and front except polished tubercles distinctly and usually closely punctate; entirely shining black. Antennae dark with somewhat paler basal joints, third joint shorter than fourth or fifth, which are subequal, the fourth slightly longer. Prothorax over twice as wide as long, somewhat convex, narrowed anteriorly with sides nearly straight, distinctly alutaceous, not shining, finely punctate; pale with three small median black spots—two roundish ones anteriorly and a more elongate median one. Scutellum black. Elytra slightly convex, broadly oblong oval, with humeri not prominent and with only a trace of intrahumeral sulcus; surface alutaceous, closely and distinctly punctate, feebly shining with bluish, purplish, or aeneous luster. Body beneath with mesosternum, metasternum, abdomen, and legs shining black, indistinctly and lightly pubescent. Length, 5.2 to 6.5 mm; width, 2.8 to 3.8 mm.

Type locality.—Missouri.

Distribution.—Vermont; Massachusetts (Chicopee, Fall River, Framingham, Lynn, Springfield); Rhode Island (Watch Hill); New York (New Windsor, Staten Island, West Point); New Jersey (Boonton, Clifton); Maryland (Bladensburg, Glen Echo); District of Columbia; Virginia (Nelson County); Kentucky; Texas (Ardmore, Cypress Mills, Llano, Texline, Wolfe City); Kansas (Clark County, Douglas County, Ellis County, Garden City, Gove County, Horace, Meade County, Riley County, Oakley, Salina, Topeka, Wichita); Iowa (Iowa City, Lake Okoboji, Moscow, Muscatine, Silver Lake, Solon); Missouri (Greene County, Willard); Oklahoma (Payne County); Wisconsin (Beaver Dam, Dane County, Madison, Sturgeon Bay, Waupaca); Michigan (Ann Arbor, Belding, Niles); North Dakota (University); South Dakota (Black Hills, Brookings, Elmore, Volga, Watertown); Minnesota (Fergus Falls); Indiana (Knox); Illinois (Algonquin, Champaign, Chicago, Elizabethtown, Forest City, Dubois, Havana, Quincy, Prairie du Rocher, Rockford, Thompson Lake, Urbana); Washington (Pullman); Idaho (Coeur d'Alene); Montana (Assiniboine, Bozeman, Gallatin, Helena); Colorado (Colorado Springs, Denver, Fort Collins, Logan County, Manzanola, Olney, Rocky Ford, Sterling); Utah (Ogden, Silver Lake); Wyoming (Chugwater); New Mexico (Torrance County, Beulah, Santa Fe County, Sandia Mountains); British Columbia (Aspen Grove, Chilcotin, Merritt, Midday Valley, Rolla); Alberta (Edmonton, Medicine Hat); Manitoba (Aweme, St. Norbert); Saskatchewan (Oxbow, Redvers).

Food plants.—Beet, spinach, *Amaranthus*.

Remarks.—*D. triangularis*, a well-known enemy of sugar beets and the largest of the dark-colored North American species, is readily recognizable by the short, broad prothorax with its three black spots arranged triangularly, the distinctly punctate elytra, and the dark head and undersurface.

DISONYCHA TRIANGULARIS MONTANENSIS, new variety

PLATE 7, FIGURE 37

Description.—Similar to *D. triangularis* in color and markings; prothorax not so broad, with more rounded sides, elytra more finely and sparsely punctate; aedeagus larger and somewhat differently shaped. Length, 5 mm; width, 2.5 mm.

Type (male).—U.S.N.M. No. 43653.

Type locality.—Assiniboine, Mont., collected by H. G. Hubbard and E. A. Schwarz.

Remarks.—Described from a single specimen. It is possible that this is specifically distinct from *D. triangularis*, although closely related, since the shape of the prothorax and the sculpture of the elytra are somewhat different, and the aedeagus, while of the general shape of that of *triangularis*, differs in several details.

28. DISONYCHA POLITULA Horn

PLATE 7, FIGURE 40

Disonycha politula HORN, Trans. Amer. Ent. Soc., vol. 16, p. 211, 1889 (New Mexico and Arizona; type in Horn collection, Acad. Nat. Sci. Philadelphia).—JACOBY, Biol. Centr. Amer., vol. 6, suppl., p. 275, 1891.

Description.—Slender, oblong oval (4.5 mm), with lustrous and closely punctate green or blue elytra, the upper half of head also dark with metallic luster, lower front and prothorax pale, undersurface mostly dark, the abdominal margin, anterior femora, and basal half of posterior femora pale. Head with interocular space barely half width of head, carina slightly produced; a circle of coarse punctures on each side about fovea near eye; occiput, front, and usually tubercles dark with metallic luster, carina and lower part of head, except dark labrum, pale. Antennae dark brown with three basal joints paler; third point shorter than fourth or fifth, which are subequal, the fourth longer. Prothorax nearly rectangular, slightly convex, approximately twice as wide as long, sides a little arcuate; surface shining, very finely, sparsely and indistinctly punctate, entirely pale. Scutellum black. Elytra lustrous green or blue, closely but shallowly and sometimes rugosely punctate; somewhat convex, sides parallel, humeri well marked, a short intrahumeral sulcus within. Body beneath lightly and indistinctly pubescent, mesosternum, metasternum, and middle of abdomen dark shin-

ing brown, often with metallic luster, margins more or less pale; femora of anterior legs and basal half of posterior femora usually pale, this coloring somewhat variable in extent. Length, 4.3 to 5.2 mm; width, 2.2 to 2.8 mm.

Type locality.—New Mexico (as here restricted).

Distribution.—Arizona (Chiricahua Mountains, Clemenceau, Cochise County, Gila Valley, Globe, Graham County, Huachuca Mountains, Patagonia Mountains, Santa Rita Mountains); New Mexico (Deming, Las Vegas, Mesilla, Sandia Mountains); Kansas (Douglas County); Mexico and Guatemala.

Food plant.—*Amaranthus palmeri* S. Watson (Brisley).

Remarks.—This species, described from New Mexico and Arizona, also occurs in Kansas and extends southward through Mexico at least to Guatemala. It is easily recognized by its bright lustrous elytra, which are more densely punctate than in any other dark-colored species except *triangularis*. The diagonally separated colors of the posterior femora are striking. This pattern, however, is not peculiar to this species, as many specimens of *wanthomelas* show a similar marking.

29. *DISONYCHA VARICORNIS* Horn

PLATE 6, FIGURE 34

Disonycha varicornis HORN, Trans. Amer. Ent. Soc., vol. 16, p. 210, 1889 (Texas and Peninsula of California; type in Horn collection, Acad. Nat. Sci. Philadelphia).

Description.—Robust, oblong oval, with lustrous blue or purple, rarely green elytra, and pale head, prothorax, and undersurface, except for darkened tibiae and tarsi and apex of hind femora. Head with interocular space barely half width of head; interantennal area scarcely carinate, not at all produced; a circle of coarse punctures about fovea on each side near eye; entirely pale except labrum, which is occasionally brown. Antennae with third, fourth, and fifth joints subequal, the fourth slightly the longest; first 4 and last 1 or 2 pale, the rest reddish brown. Prothorax approximately twice as wide as long, convex, without depressions, sides with explanate margin widening anteriorly and slightly notched behind the apex; surface shining, very indistinctly punctate, entirely pale, sometimes with indefinite pale brown shadings suggestive of spotting. Scutellum usually black, occasionally dark reddish brown. Elytra lustrous blue or purple, rarely green, minutely and not densely punctate; broadly oblong and convex, with humeri well marked and a short intrahumeral sulcus. Body beneath shining, very indistinctly pubescent, pale, the tibiae and tarsi and apex of posterior femora reddish brown. Length, 5 to 6.2 mm; width, 3 to 3.3 mm.

Type locality.—Texas (as here restricted).

Distribution.—Texas (Beeville, Brownsville, Corpus Christi, Harlingen, New Braunfels, San Diego, Sharpsburg); California (San Diego); Lower California (Santa Rosa, San Felipe).

Food plants.—*Opuntia leptocaulis* and *O. arborescens* (Hunter, Pratt, Mitchell).

Remarks.—*D. varicornis* is unlike any North American *Disonycha* in the shape of its prothorax. The broadened apical angle of the explanate margin and the notching behind the angle on the margin, together with the varicolored antennae, are distinguishing characters for this species. It is closely related to *D. mexicana* Jacoby, which has a similarly shaped prothorax but has entirely brown antennae with the third antennal joint much shorter than the fourth. The legs of *mexicana* are paler, and the aedeagus quite unlike that of *varicornis*.

30. DISONYCHA FUNEREA (Randall)

PLATE 6, FIGURE 35

Haltica funerea RANDALL, Boston Journ. Nat. Hist., vol. 2, p. 47, 1838 (Canton, Mass.; type lost).

Disonycha funerea CROUCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873.—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 208, 1889.

Description.—Elongate oval, entirely lusterless black except the last 2 or 3 ventral segments, which are more or less pale yellow; antennae short and heavy. Head with the interocular space over half width of head; interantennal area not carinate, but flat and broad; tubercles rather indefinitely marked; surface dull black, distinctly alutaceous with a few scattered punctures on each side about fovea near eye. Antennae black, not extending much below humeri, third and fourth joints subequal with fourth slightly longer, remainder a little shorter, all nearly as broad as long. Prothorax scarcely twice as broad as long, convex, somewhat narrowed anteriorly with sides nearly straight; surface entirely dark, lusterless, distinctly alutaceous, with fine and moderately dense punctation. Scutellum black. Elytra elongate oval without humeral prominences, convex; surface entirely lusterless black, distinctly alutaceous, finely punctate. Body beneath alutaceous, nearly glabrous, dark except the last 2 or 3 ventral segments, which are either entirely pale or with pale margins, the last segment being entirely pale; legs black. Length, 6 to 6.8 mm; width, 2.8 to 3.5 mm.

Type locality.—Canton, Mass.

Distribution.—Massachusetts (Brighton, Sherborn, Wellesley); Connecticut (Old Lyme); Georgia (Thomas County); Alabama (Mobile).

Food plant.—Unknown.

Remarks.—This is the most curious and probably one of the rarest of North American species of *Disonycha*. In its dull black coloring and heavy antennae it is suggestive of *Oedionychis lugens*. So few specimens are known to the writer that each is worthy of mention. There are three specimens in the old Harris collection in the Boston Society of Natural History, taken in Brighton, Mass., in a dry pasture under a stone on October 26, 1839. Two specimens are in the LeConte collection at Cambridge, one of which bears the same label as those in the Harris series, and the other is without label. There is one specimen in the Bowditch collection labeled Colorado, which is doubtless a mistake as it might easily have been confused in some collection with *Oedionychis lugens*, which occurs in that locality, and later wrongly labeled. There are 2 specimens in the Horn collection, 1 from Georgia and 1 without label. C. A. Frost possesses a specimen taken by A. P. Morse at Wellesley, Mass., and there is one at the Connecticut Agricultural Experiment Station taken at Old Lyme, Conn. H. P. Loding collected a specimen at Mobile, Ala. In the National Museum are two specimens, one collected by E. J. Smith at Sherborn, Mass., and secured for the Museum by C. A. Frost, and the other, presented to the Museum by W. L. McAtee, was found in the stomach of a quail (*Colinus virginianus*) collected by H. M. Hanna, February 2, 1927, at Melrose Plantation, Thomas County, Ga.

31. *DISONYCHA BREVICORNIS* Schaeffer

PLATE 8, FIGURE 42

Disonycha brevicornis SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 281, 1931 (Colorado; type in collection Charles Schaeffer).

Description.—Small (5.8 mm), not depressed, oblong, faintly shining, yellow, head with occipital band, tubercles, and labrum dark, pronotum heavily spotted, elytra with usual median, sutural, and submarginal vittae; body beneath dark with base of femora, the tibiae, and the tarsi dark. Head with interocular space more than half width of head; smooth except for a few coarse punctures on sides near eye; tubercles distinct, interantennal area slightly produced; a broad, dark, occipital band extending to and covering tubercles; carina in part and labrum dark. Antennae extending to a little below humeri, dark with paler basal joints, fourth longer than third and fifth, which are subequal. Prothorax scarcely twice as broad as long, without callosities, sides arcuate, narrowed anteriorly; surface finely alutaceous and finely punctate; 5 pronotal spots, the 3 median tending to coalesce and the 2 lateral ones large.

Scutellum dark. Elytra with dark sutural, median, and submarginal vittae, the sutural and submarginal not joined at apex; humeri not prominent, a short intrahumeral sulcus; median dark vitta with a slight ridging extending from below humerus the length of the elytral vitta; surface finely alutaceous and finely punctate. Body beneath finely pubescent; mesosternum, metasternum, and abdomen except last segments dark; base of femora, the tibiae, and the tarsi darkened. Length, 5.8 mm; width, 3 mm.

Type locality.—Colorado. (One paratype, a male, in collection of U.S. National Museum.)

Remarks.—Mr. Schaeffer has sent me 1 of his 3 specimens of *D. brevicornis* for examination and has donated it to the National Museum (U.S.N.M. No. 44114). This species is most distinct and unrelated to any other north of Mexico. It does not belong to the *pennsylvanica* group, although it resembles that group in the dark marking of the head and undersurface and the suggestion of an elytral costa. The antennae are shorter than in that group, and the prothorax is longer and more convex, without depressions or callosities. The aedeagus is quite unlike any that I have seen in any other *Disonycha*.

The specimens bear simply the old label "Col.", and since their source also is obscure, material from a more definite locality is needed to corroborate the locality Colorado.

32. DISONYCHA STENOSTICHA Schaeffer

PLATE 8, FIGURE 43

Disonycha stenosticha SCHAEFFER, Journ. New York Ent. Soc., vol. 39, p. 285, 1931 (Brownsville, Tex.; type in collection Charles Schaeffer).

Description.—Large (7 mm), broadly oblong, not depressed, shining, pale yellow, tip of mandibles, antennae, tarsi, and very narrow sutural, median, and submarginal elytral vittae dark. Head pale with tip of mandibles darkened; shining, smooth, only a few punctures on each side about fovea; frontal tubercles not swollen; interantennal area slightly produced, rounded; interocular space about half width of head. Antennae extending about to middle of the elytra, dark, with three basal joints paler; fourth joint longer than third or fifth, and fifth longer than third. Prothorax about twice as wide as long, convex, without callosities; sides slightly arcuate and narrowed anteriorly; surface smooth, shining and nearly impunctate; faint traces of four brownish spots, but no trace of median line. Elytra broadly oblong, with humeri well marked, a short intrahumeral sulcus within; surface smooth, shining, nearly impunctate; elytral vittae very narrow, the submarginal vitta becoming indistinct

at base and apex, and not joining at apex with sutural vitta; the sutural vitta extending about scutellum. Body beneath pale, covered with fine pale pubescence, tibiae slightly darker at apex and tarsi dark. Length, 7 mm; width, 4 mm.

Type locality.—Brownsville, Tex., collected January 17, 1923, collector's name not given.

Remarks.—Mr. Schaeffer has lent me his type specimen, a female, for examination. Its sides are more parallel than those of the *discoidea* group, which it most resembles, and the elytral humeri are more pronounced. Although a smaller species, its smooth, brilliant surface, narrow vittae, and oblong shape suggest *Cacoscelis quinquevittata* Latreille, and it may be a connecting link between this group and the *discoidea* group. Except for the paler tibiae, it corresponds with Jacoby's description of *D. militaris*, described from Mexico and Central America, and also with my notes on that species, a cotype of which is in the Bowditch collection in the Museum of Comparative Zoology. Until a restudy of the Jacoby type series can be made, the present species may stand as distinct.

DOUBTFUL SPECIES

Cistela quinquevittata FABRICIUS, Syst. Ent., p. 118, 1775 (Carolina); Spec. Ins., vol. 1, p. 148, 1781; Man. Ins., vol. 1, p. 86, 1787.

Cistela svittata FABRICIUS, Ent. Syst., vol. 1, pt. 2, p. 47, 1792.

Disonycha quinquevittata GEMMINGER and HAROLD, Catalogue, vol. 12, p. 3496, 1876 (as synonym of *D. caroliniana*).—HORN, Trans. Amer. Ent. Soc., vol. 16, p. 315, 1889 (as synonym of *D. caroliniana*).

“Testacea, elytrorum marginibus vittaque media nigris. Habitat in Carolina. Dom. Monson. Corpus testaceum, antennis nigris, serratis. Elytra rufescentia, margine omni vittaque in medio uniuscuiusque elytri nigris. Femora postica valde incrassata, intus canaliculata” (Fabricius, 1775).

Fabricius (1775) first called this *Cistela quinquevittata*, but in 1792 he gave the name as *C. svittata* (evidently a typographical error for *5-vittata*) and suggested that it might possibly be a chrysomelid. In 1801 he still further abbreviated it to *C. vittata* (possibly influenced by Olivier, 1789,³⁰ who listed an *Altica vittata*), and at the same time doubtfully synonymized it with *Galleruca caroliniana*.³¹

The identity of *Cistela quinquevittata* with *Disonycha caroliniana* has never been properly established. Gemminger and Harold appear to be responsible for referring it to synonymy with *D. caroliniana*. Whether their use of the name *quinquevittata* invalidates Say's name *quinquevittata* applied to a different species is an open question.

³⁰ Olivier, Encyclopédie méthodique, vol. 4 (Insects, vol. 1), p. 105, 1789 (*A. glabrata* cited as synonym).

³¹ Fabricius, Systema Eleutheratorum, vol. 1, p. 491, 1801.

Altica mellicollis SAY, Descriptions of new species of North American insects found in Louisiana by Joseph Barabino, p. 10, 1831 (Louisiana); Boston Journ. Nat. Hist., vol. 1, p. 199, 1835 (Missouri). (The original description is published in a rare publication, a copy of which is in the Boston Society of Natural History, and was printed by the "School Press, New Harmony.")

"*A. mellicollis*, Head black; thorax yellowish; elytra blue. Inhab. Louisiana. Head blue-black, with rather large punctures each side, between the antennae convex, dark piceous; antennae black brown, three basal joints honey yellow beneath: palpi black: thorax pale honey yellow, punctures not obvious: scutel impunctured: elytra with numerous, small, distant punctures, not profound, dark violaceous blue: pectus yellowish: postpectus blackish: venter blackish, last segment dull yellow: thighs honey yellow; tibiae black, yellowish at base: tarsi black. Length nearly one fifth of an inch. Related to *collaris* Illig. and *collata* Fabr., particularly the latter, from which it may be distinguished by its blue elytra, and immaculate face." This species is discussed under *D. collata*.

Haltica vicina KIRBY, Fauna Boreali Amer., vol. 4, p. 217, 1837 (Canada; type lost).

"*Pallida*, pectore, capite punctis tribus; prothorace quatuor lineolaque, coleoptris vittis quinque, tarsisque, nigris. L. body $3\frac{1}{3}$ lines." K. G. Blair, of the British Museum, writes that the type of this species has been lost. From the description it might be either *D. uniguttata* or *D. procera*.

Disonycha limbicollis var. *pallipes* CROUCH, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 64, 1873. (Type locality not given; type not in Crouch's collection in England or in this country so far as can be found.)

"Elytra yellow with black vittae.

Under surface pubescent.

Thorax short, sides broadly reflexed with a marked callus, head black.

Legs and under side black.

Hind femora at least and part of the body red. *limbicollis*.
V. pallipes."

This variety has been discussed under *D. procera* and *uniguttata*.

Altica quinquevittata SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 4, p. 85, 1824 (Missouri).

"Yellowish: thorax 4- or 5-spotted; elytra 5-lined. Inhabits Missouri. Body oblong-oval, yellowish, glabrous; antennae black, 3 basal joints rufous beneath; thorax with an abbreviated, black line in the middle of the posterior submargin, and a semicircular series of 4 equal, equidistant, suborbicular black spots; posterior edge concave at the scutel; scutel black; elytra with a common sutural fillet; each elytron with a fillet originating at the humerus and terminating

near the tip, and another marginal, less dilated fillet, confluent with the sutural vitta at tip; region of the origin of the posterior feet black; thighs rufous; tarsi, and a line on the superior edge of the 2 anterior pairs of thighs together with a line on the inferior edge of the tibiae, black. Length more than three tenths of an inch.

“The arrangement of the lines of the elytra are similar to those of *A. caroliniana* Fabr. The head is sometimes black at base and the two intermediate thoracic spots are confluent. Found in considerable numbers on common elder (*Sambucus*) and some other shrubs. On the evening of the 16th of June, I observed great numbers of these flying in a southeast direction from near St. Louis, obliquely across the Mississippi towards an island, the wind at the same time blowing moderately from the eastward; the subsequent evening, about the same hour, they returned by the same route reversed, the wind directly opposing them; both of these days were very warm. During our progress up the Missouri River, I observed several times similar migrations of this species.”

I have been unable to learn of any species of *Disonycha* that feeds on elder. In view of the fact that elder frequently grows in the same locality with willow and the fact that these insects were exceedingly abundant, Say may have seen specimens on elder although the willow was the real food plant. This is indicated in his statement that they occurred on “some other shrubs.” His description unfortunately applies equally well to three species of *Disonycha*, all of which occur in the locality given—*alternata*, *pluriligata*, and *punctigera*. For further discussion, see remarks under those species.